Volunteer Firemen

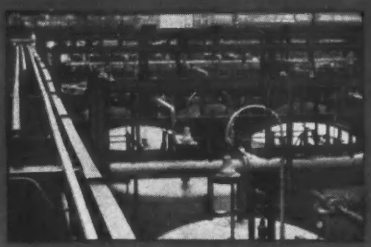
JANUARY

1945

NATIONAL FIRE PROTECTION ASSOCIATION
60 Batterymarch Street INTERNATIONAL Boston 10, Massachusetts

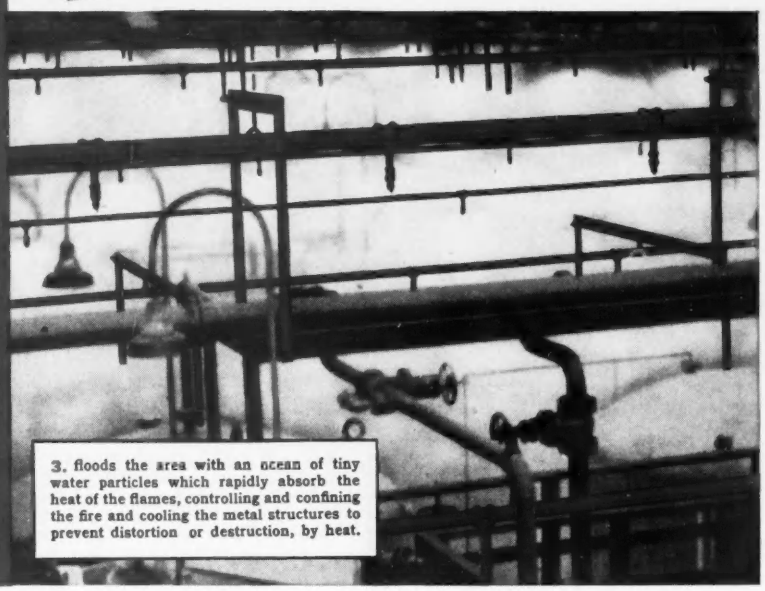
WAR DEPENDS ON RUBBER—

SYNTHETIC RUBBER depends on . . . WaterFOG



1. A leak permitting escape of highly flammable vapors from these huge butadiene and styrene production tanks . . . a spark . . . and the entire area of this important synthetic rubber plant would be threatened with destruction . . . EXCEPT FOR

2. . . . the fact that this synthetic rubber plant is protected by the most effective method of cooling and confining fires in highly flammable vapors or liquids. Because of WaterFOG (two additional spring into operation in this picture) . . .



3. floods the area with an ocean of tiny water particles which rapidly absorb the heat of the flames, controlling and confining the fire and cooling the metal structures to prevent distortion or destruction, by heat.

Rockwood WaterFOG

strips flammable vapors of their threat

At one of the country's largest synthetic rubber plants, five WaterFOG systems — part of a completely engineered Rockwood fire protection system — stand watch over 34 huge processing and storage tanks. The tanks they guard, measuring 18½ feet high by 8 to 10½ feet in diameter, contain butadiene and styrene . . . extremely vulnerable in case of fire.

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WaterFOG — created by impinging streams of water from Rockwood nozzles — is effective on flammable liquid or vapor fires where spray and solid streams are frequently unsafe. It absorbs heat faster, retards vaporization, doesn't splash. Both Underwriters' Laboratories and Associated Factory Mutuals approve Rockwood WaterFOG installations of fixed piping. WaterFOG nozzles for hose lines also available. Write for Bulletin 123.

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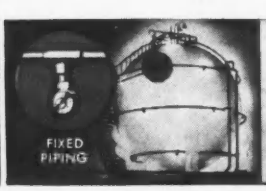
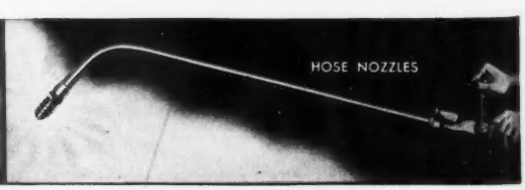
TYPICAL WaterFOG APPLICATIONS	
quench and dip tanks	oil switches
paint shops	dryers
transformers	oil storage
	etc.

Water Engineered by Rockwood
Cools, Confines, Smothers Oil Fires

ROCKWOOD WaterFOG





GAMEWELL FIRE ALARM SYSTEMS

Eliminate Delay - - - Reduce Fire Losses

THE CONTROL UNIT
VITAGUARD TYPE

This Unit contains all battery, operating, recording and testing equipment necessary for the operation of a system ranging from One to Forty alarm boxes. We supply complete directions for installing.

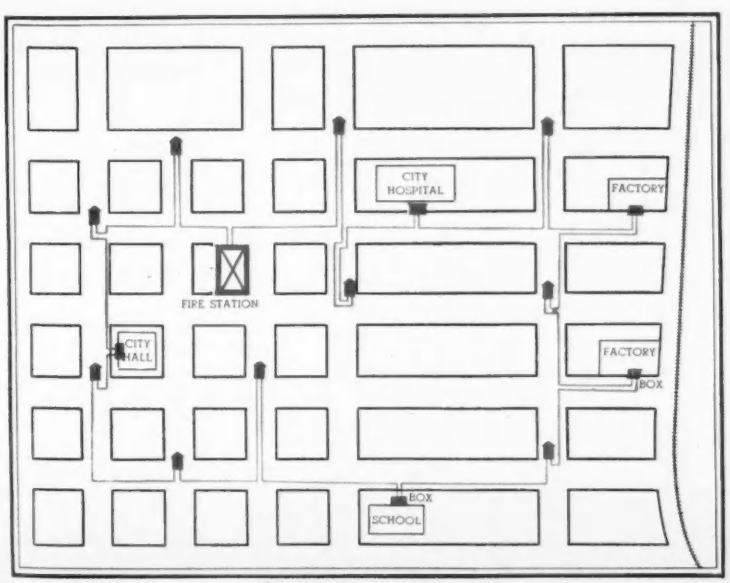
THE GAMEWELL SYSTEM for Volunteer Fire Departments provides the essential elements of accessibility, dependability and speed in giving alarms.

Public fire alarm boxes, quickly accessible, coupled with automatically responsive and coded public alarm equipment *eliminates delay by directing firemen to the scene of fire.*

WE INVITE YOUR INQUIRY.

GAMEWELL FIRE ALARM BOX
VITAGUARD TYPE

With guard panel pulled forward exposing operating lever.



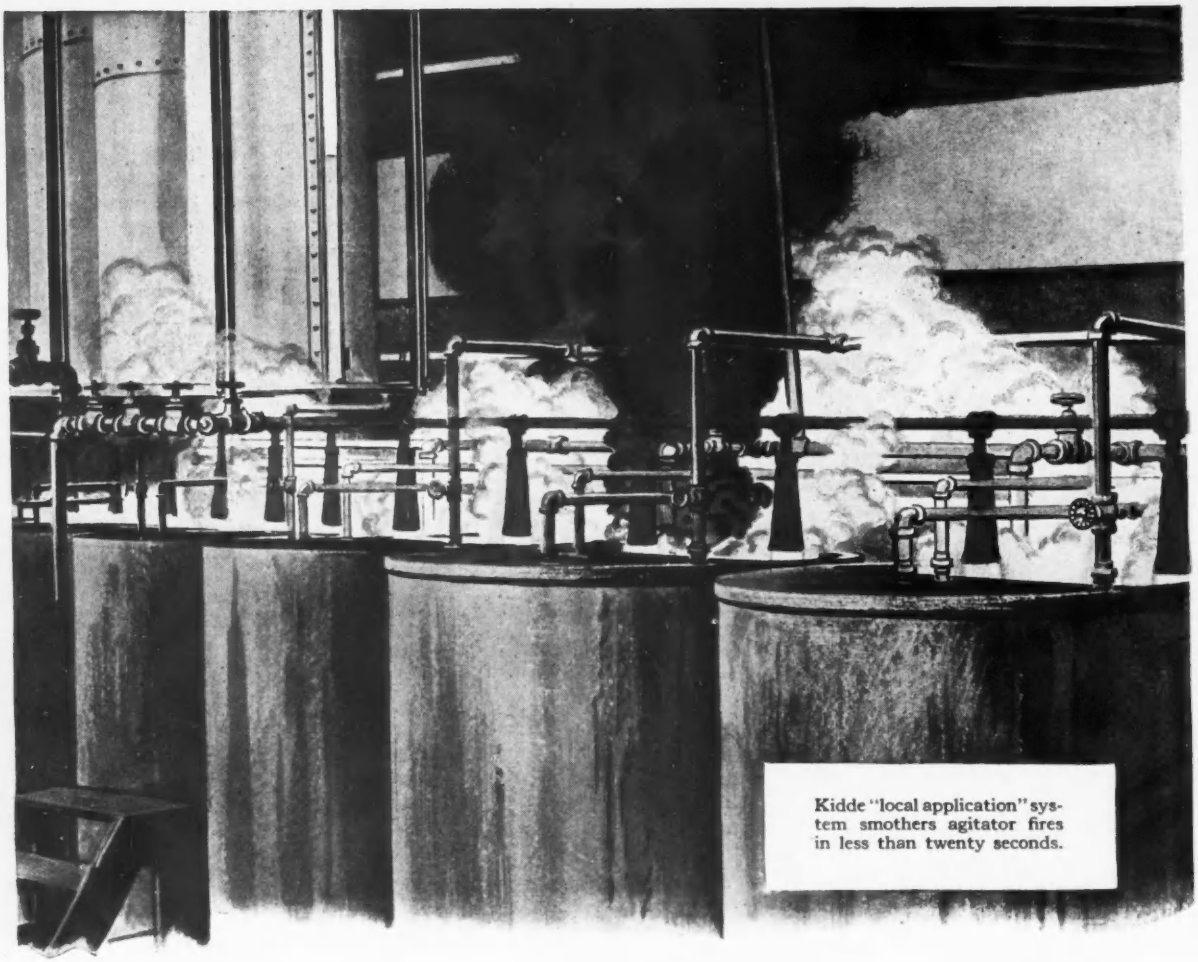
TYPICAL PLAN OF SYSTEM

DIAPHONE HORN

Operated by compressed air. Has great carrying power, distinctive tone and coding ability. A reserve supply of compressed air is automatically maintained.

NOTE: *Your own public alarm may be utilized and automatically operated by the Vitaguard System.*

THE GAMEWELL COMPANY
Newton Upper Falls, Massachusetts



Kidde "local application" system smothers agitator fires in less than twenty seconds.

KIDDE GETS 'EM YOUNG . . . and treats 'em rough!

Big blazes begin life as little ones. But they grow fast, and *get tough* when they feed on flammable liquids (Class B fires), or on electrical equipment (Class C). Ordinary water type extinguishers cannot stop these tough fires. But all laboratories *do* approve smothering them under a barrage of carbon dioxide gas.

That's the method used in Kidde built-in systems to choke off tough fires as soon as they start . . . *in less than twenty seconds* . . . directing the carbon dioxide to the flames from specially designed nozzles. When *automatic* systems are used, fires are frequently killed before nearby workers realize a fire has started.

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For safety's sake, check the accompanying list of typical industrial fire hazards. If you have one of the tough-fire hazards in your plant, call in a Kidde representative. You'll find him wise in the ways of fire prevention. Drop us a line.

KIDDE KILLS TOUGH FIRES

Process Rooms
Ovens
Spreaders
Motors
Storage Rooms
Mixers
Coaters
Transformers
Dip Tanks
Agitators
Washing Trays
Control Panels

★

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Volunteer Firemen

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THE VOLUNTEER FIREMAN

THIS month's cover picture (*Chicago Sun*) is of the dramatic and costly fire that occurred on November 29th in the Rosenbaum Brothers grain elevator in Chicago. Losses amounted to nearly $2,000,000.

Fire protectionists about Chicago have for years expected this old-style elevator to meet its end. Such ancient combustible structures that do not conform to N.F.P.A. Standards for the Prevention of Dust Explosions in Terminal Grain Elevators will always be liable to chance ignition and destruction. No such major fires have been reported from elevators meeting these standards of protection.

In 1930, '33, and '39 similar disastrous fires swept elevators owned by the same grain corporation.

FIRE Marshal Anthony J. Mullaney, Chief of the Chicago Fire Department and a member of the N.F.P.A. Board of Directors, in reporting this fire at a recent meeting in Chicago on Farm and Rural Fire Protection, paid glowing tribute to the performance of 4 OCD pumping units used in combating the fire. These machines were used constantly for 36 hours without relief, and intermittently for several days following the fire while burning grain was being salvaged. At the height of the fire, they supplied 1½-inch turret streams, discharging 600 g.p.m. at nozzle pressures between 80 and 100 pounds. These OCD pumps were mounted on Chicago Squad Company trucks and other department vehicles.

He also spoke of the other uses made of a large number of 4-gallon OCD pump tank extinguishers in protecting seriously exposed structures adjacent to the burning elevator. He stated that sparks were showering upon these combustible buildings "like fire flies," but that members of the Chicago Fire Department and Chicago Fire Insurance Patrol using large numbers of fire department and OCD pump tank extinguishers kept busy putting out fires in burning grain dust.

The Chicago Fire Department had some 80 to 90 pieces of fire apparatus in operation in the gruelling service required to halt the progress of the fire. The OCD pumps turned in a 100 per cent performance.

CHIEF GROVER D. LOVEJOY, of Waterville, Maine, President of the Maine Fire Chiefs' Association reports that his men have had no further trouble by breaking fire axe handles since his department has started using an axe with a straight rather than the customary curved handle. The fire axe heads used by his department weigh only 3½ pounds because experience has shown that a lighter weight fire axe permits firemen to do much more effective axe work on roofs and from ladders than is possible when the customary heavy axe is used by men wearing fire clothes and working under winter conditions.

IT MAY be the same old story, but one of the worst headaches faced by fire departments is the problem of delayed alarms while employees fight fire.

This fire which occurred in the business district of Jennings, La., during October, is typical. A garage mechanic set a two-gallon pail of gasoline on a work bench which was not properly secured and which was unbalanced by a heavy vice. Leaning on the bench, he upset the gasoline which ignited from an open flame gas heater. Employees attempted to fight the fire with two 2½-gallon foam extinguishers and three glass bulb fire extinguishers before calling the fire department. This permitted the fire to spread to an adjoining bakery before the flames could be controlled. Using two pumpers to supply 4 hose streams, and two additional hydrant lines, the firemen attacked the fire through the bakery and prevented further spread of the flames.

A greater loss would have occurred but for the excellent fire fighting and salvage work of the Jennings Volunteer Fire Department. Chief C. A. Hill and Secretary C. Barnette report that unprotected openings and combustible walls between the structures permitted the spread of the fire and indicated that the fire department could easily have controlled the fire had they been called immediately.

The Jennings Fire Department makes it a policy in the high-value district to lay dual lines from its pumpers so as to lose no time in getting adequate numbers of streams on fires in business properties. Loss $13,900 out of $52,000 valuation.

FIRE losses in the United States during November were estimated at $33,847,000 according to figures of the National Board of Fire Underwriters. The total fire losses for the 12 months ending November 30, 1944, were $426,149,000, compared with a total of $369,911,000 for the 12 months ending a year earlier. November losses were 7 per cent above the losses for November, 1943.

Canadian fire losses for November were $2,000,000, the same figure as the October total, but a 43 per cent drop from November 1943.

High Tension Wires and Blazing Gasoline

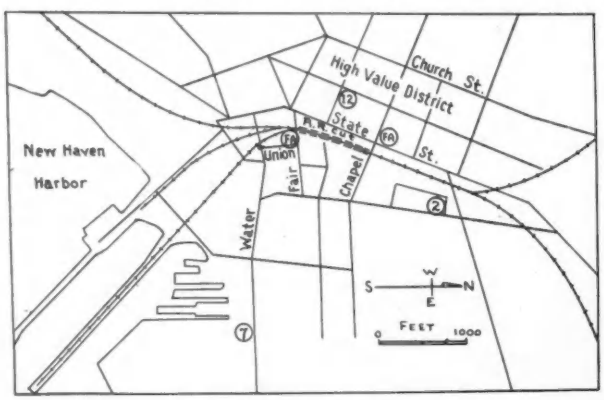
Report by Chief Paul P. Heinz, (member N.F.P.A.)
New Haven, Conn., Fire Department

"SHORTLY before 9:44 A.M. on Saturday, November 18th, a freight train hauling cars through the New Haven 'Cut' between Chapel and Fair Streets, adjacent to one of the main arteries of the city, in some manner piled up and upset a tank car containing 10,141 gallons of gasoline rupturing the tank, over which several other freight cars piled and immediately caught fire.

"This accident occurred in the high-tension zone. The wires carried 11,000 volts and were part of the electrified system operating between Cos Cob and New Haven. The crash pulled down the high voltage wires, which ignited the flowing gasoline.

"An alarm of fire from Box 314 at south side of 'Cut,' was received at 9:44 A.M., closely followed by Box 26, at north side of 'Cut.' Because of the proximity of both boxes, the first box was transmitted.

"On the west side of the 'Cut' was an elevated viaduct (see picture above), a private right of way for trolley cars, but accessible for other vehicles in case of emergency. The viaduct was about 35 feet above the tracks in the 'Cut' and gave an excellent overall view of the situation to the fire department upon their arrival. On the extreme west side of the 'Cut,' adjoining the viaduct, were several mercantile buildings; the rear of these buildings completing the enclosure of the 'Cut.'



Location of railroad cut where fire occurred. Nearest fire companies and fire alarm boxes shown in circles.

"The Deputy Chief, upon arriving, observed the high-tension wires arcing against the rails, and his first thought was the safety of the men. All men were ordered out of the fire area until official word had been received that the current was shut off. This delayed operations for about eight minutes, but the absence of water for this period was not a serious factor because there were no immediate exposures. However, the intense heat from the burning gasoline was increasing at a rapid pace, and fanned by a stiff easterly wind the fire threatened the rear of the buildings on the west side of the 'Cut.' Three deck-guns were located on the viaduct and heavy streams were directed on burning wood freight cars adjacent to the fire. A water curtain was formed to cool off the high temperatures in the rear of the mercantile buildings.

"A second and third alarm were sent in, and seven engine companies and three hook and ladder trucks responded, together with the Chief, Deputy and Battalion Chief, and a total of 50 officers and men.

"Subsequently official word was received that the high voltage current was 'off,' and all companies reporting in were ordered to line-in with fog nozzles and descend into the 'Cut' by ladders which were placed by the truck companies.

"Three 2½-inch Rockwood fog nozzles, six 1½-inch Rockwood fognozzles, together with three deck-guns and two 2½ inch straight streams were used to extinguish the fire. Three of the 1½-inch fog nozzles used the 6-foot applicators, while all other fog appliances used the high-velocity head only. When the fog nozzles went to work, the three deck-guns on the viaduct were shut down.

"The fire originated between two bridges about 600 feet apart. The 'Cut was about 300 feet in width. The flowing gasoline was approaching the underneath of the Chapel Street bridge when the first fog nozzle went into action. The flowing gasoline was immediately extinguished, and the men proceeded to fight the fire from this point, advancing their fog appliances until the entire lee side of the fire was protected by water-fog.

"After fifteen minutes of operation with fog, it was apparent that the fire had already reached its peak. In about 25 minutes the burning gasoline was confined to an area of about 30 feet in diameter; and in 40 minutes the burning gasoline was extinguished. Only two small flash-backs occurred during the entire operation. No injuries were reported.

"A steel freight car, loaded with merchandise and sealed, toppled over the tank car when the crash occurred, and the intense heat from the burning gasoline warped the only entrance door to the interior of the

car. The merchandise inside the car was burning intensely, and the fire department used cutting torches to open it. Two torches were used and openings about two feet square were made at both ends of the steel car. Straight streams were used to cool down the burning materials. This operation took about 35 minutes. The fire in the contents of the car was not entirely extinguished because railroad officials requested that we leave the area so that their wrecking crew could take over and open the main lines for traffic.

"Our department left the scene of the fire about 11:20 A.M. One 2½-inch line was left with the railroad workers to wet down and cool, for several hours, the smouldering freight cars and debris. Several hundred gallons of unburned gasoline were left in the tank after extinguishment.

"The intensity of the burning was so great that heavy steel towers supporting the high-tension wires were twisted and partially removed from their bases. About twenty feet of the heavy rails were twisted and had to be replaced.

"The cause of the fire was attributed to a defective wheel flange on a freight car, which derailed the car and upset the tank car and others. The fire was caused by a spark from the high voltage wires against the rails following the crash.

"The loss was estimated at $51,000, of which $35,000 was merchandise, consisting of cotton goods and gasoline.

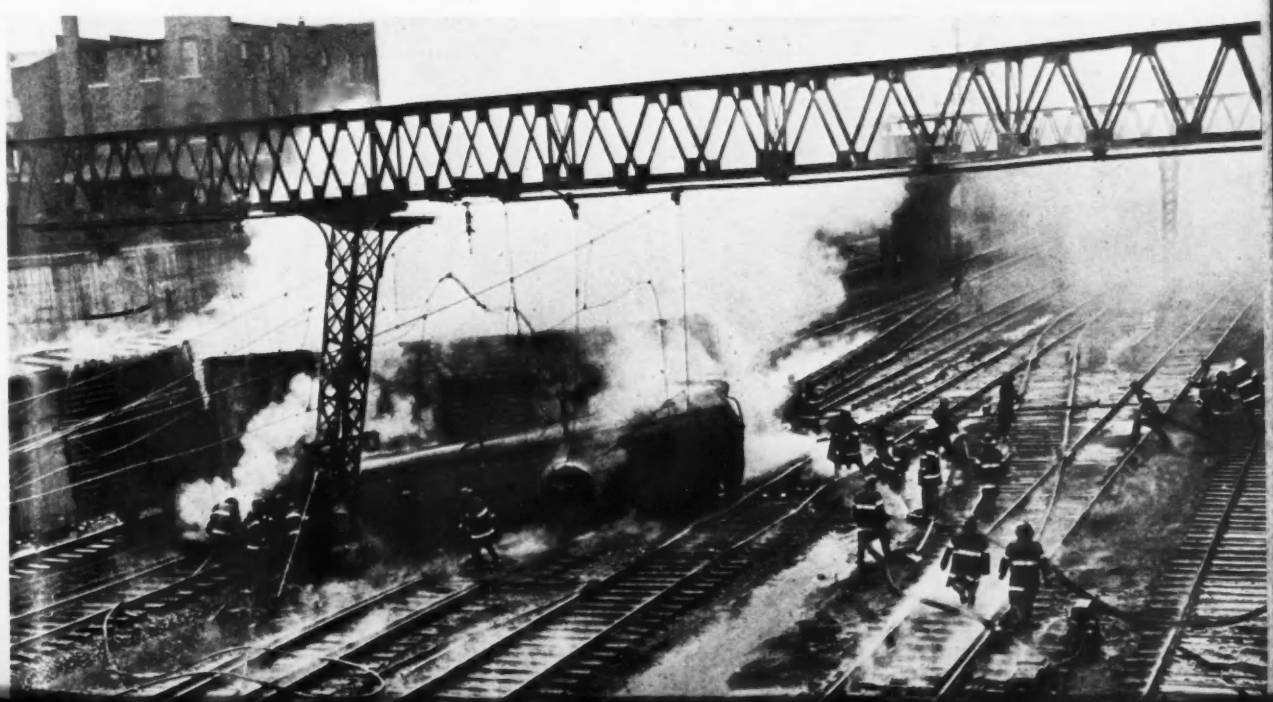
"In June of 1944, the New Haven Fire Department inaugurated a technical training program in Liquid Fire Fighting. Suitable grounds were provided and large open tanks, overhead tanks, enclosed metal buildings, and a crash airplane were erected to simulate the various types of gasoline fires which might be encountered by municipal fire departments.

"Water-fog was selected as the most efficient appliance for the fire department's work, and the entire New Haven Fire Department was equipped with Rockwood fog nozzles, both the 2½-inch and the 1½-inch all-purpose nozzles with applicators.

"Every company in the department received training in the use and application of fog. The men were taught how to fight an oil fire and were then made to extinguish such fires.

"This type of fire training proved conclusively the value of practical education for fire departments. By this training, the men became adept in handling the equipment provided for fighting oil fires. They had confidence in their equipment, which could not have been acquired by lectures or book learning alone. Thus they were not frightened by the sight of a large gasoline fire and tackled the job in an efficient, workmanlike manner. Had it not been for the training the firemen had received and the fact that our department was properly equipped with fog nozzles, New Haven would have been faced with a conflagration involving the mercantile area of our city."

The extent of the fire before water-fog was applied.



After the fire was extinguished, rails and steel towers supporting high tension wires were twisted and almost removed from their bases.

Lots of Water from a Little Two Pump Engine

Reported by Fire Commissioner Horace B. Clark
Lost Acres Fire Department, North Granby, Connecticut

HOW a little 20-year-old pumper with only a 45-horse power motor and a worn 300-gallon rotary pump can come close to equalling the performance of a 500-gallon engine by no other change than the addition of a 250-gallon front-end centrifugal pump was demonstrated last fall at a field day of the Connecticut Fire Department Drillmasters' Association, held in Simsbury, Conn. An interesting detail of the two-pump engine's operation is that the increased delivery does not call for increased motor speed, but to the contrary, is brought about at less such speed than is required for delivery of rated capacity by the rotary pump alone.

The machine in question is on a Reo Speed Wagon chassis; the motor is 4-cylinder, the original pump is a Hale. It is owned by the writer, a former fire commissioner in Hartford and now commissioner of the department in Granby, Conn., where the pumper serves as an auxiliary. The pump was reconditioned in 1936, new vanes were installed during the past summer, but it is known to be worn. In 1942, to provide a means of training wartime auxiliary firemen on a pump of the type which they would have to use, a new, single stage Barton centrifugal was installed on the front end. The 250-gallon size was selected because its rated delivery called for a motor speed of 1500 r.p.m. and that was closely matched by the figure of 1480 r.p.m., 80 per cent of the Reo's motor peak and the limit desired by Underwriters' for capacity delivery. Either pump can be operated by itself or both at the same time; they are not inter-connected and each requires separate suction and discharge lines.

The first pumping at the field day was at draft. The lift was small, but suction lines were 30 feet of 3½-inch in order to reach deep water; hose lines were only single lengths. This part of the demonstration was aimed to show how water-throwing capacity has been greatly increased by the joint use of both pumps, while the motor speed is kept down. The percentages given for this are on the basis of 1,500 r.p.m. of motor, or 1,000 r.p.m. of pump, for 300 g.p.m. delivery of rotary pump, the ratio in capacity operation at high gear being 1.5 to 1.

Some of the results were:

3 streams ¾-inch, 2 from rotary: 260 g.p.m.; 1 from centrifugal, 150 g.p.m.; total, 410 g.p.m., r.p.m., 87 per cent.

4 streams ¾-inch, 2 from each pump: Rotary, 244 g.p.m.; centrifugal, 260 g.p.m.; total, 504 g.p.m., r.p.m., 81 per cent.

2 streams 1-inch, 1 from each pump: Rotary, 238 g.p.m.; centrifugal, 213 g.p.m.; total, 451 g.p.m., r.p.m., 79 per cent.

2 streams 1⅛-inch, 1 from each pump: Rotary, 245 g.p.m.; centrifugal, 265 g.p.m.; total, 510 g.p.m., r.p.m., 82 per cent.

Discharging from the two pumps, siamesed into a 1¼-inch stream, giving 381 g.p.m.

3 streams: 1 of 1⅛-inch from rotary, 243 g.p.m.; 2 of 1-inch from centrifugal, 334 g.p.m.; total, 577 g.p.m., r.p.m., 81 per cent.

Siamesed lines, 1 from each pump: 1⅜-inch tip, 434 g.p.m.; 1½-inch 472 g.p.m.

The first playout is described as illustrating with particular clarity the increased value of the 2-pump arrangement in the supposed case of a fire calling for three streams of ¾-inch, as used in the country, but with the department entirely dependent on the one engine. With only the 300 g.p.m. rotary pump available, each such stream would be limited in power to 35 lbs. and in volume of 100 g.p.m., while delivery would require 100 per cent of pump and motor speed. In the demonstration, the 60 lbs. nozzle pressure for the two streams from the rotary pump was almost twice that available in the supposed case; the 80-lb. nozzle pressure for the centrifugal's stream was more than twice that set down for the supposed case; the total amount of water thrown was increased over 33 per cent. Yet it was all done at 13 per cent less motor speed than possible with the single pump.

The last playout of single streams was in two parts. First, two streams of 1-inch size were operated from the centrifugal, with wide open throttle, delivering 364 g.p.m. Then one stream of 1⅛-inch from the rotary was added; the pump pressure of the centrifugal dropped only 10 lbs., its delivery decreased only 30 g.p.m., while the new stream provided 243 g.p.m., a net gain of 213 g.p.m. for a total of 577 g.p.m., the largest discharge of the day. (At a trial two years before, when the rotary pump was in better condition, this same layout resulted in a delivery of 615 g.p.m.; r.p.m., 85 per cent.)

In the capacity work the highest pressure at the rotary pump was 70 lbs. and the average for the five operations, 62 lbs.; for the centrifugal, the corresponding figures were 80 and 66. These, while often sufficing in the country, were recognized as not high enough for municipal service, and three other trials were conducted, aimed to ascertain the practical value, if any, of such a 2-pump rig under conditions more nearly representing those to be met with in actual fire service when an engine would work from a hydrant, getting water under pressure, and would use longer hose lines. For lack of hydrant, two other machines, operating from draft, were used to supply the two pumps of the Reo. On the rotary pump, the intake pressure was taken from the compound gauge. On the centrifugal, which had only one gauge, showing discharge pressure in the pump chamber, another gauge was inserted in the supply line 8½ feet from the actual intake point and readings were taken there. Hose lines from the Reo were 500 feet, one such from each pump. Three pairs of streams were arranged for: 1-inch under approximately 40 lbs. residual pressure; 1⅛ inch under the same; 1⅛ inch under approximately 60 lbs.

The results, in the same order, were:

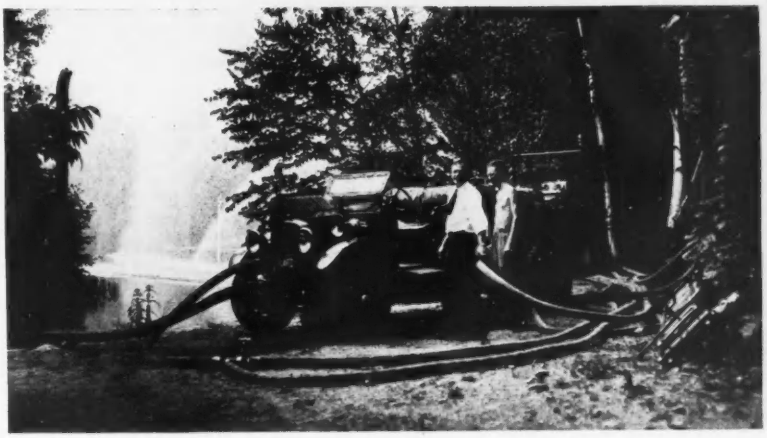
1-inch, rotary: Compound gauge, 40 lbs.; pump pressure, 120 lbs.; nozzle pressure, 53 lbs.; g.p.m., 215. Centrifugal: Intake line gauge, 42 lbs.; pump pressure, 100 lbs.; nozzle, 49 lbs.; g.p.m., 207; total, 422. R.p.m., 72 per cent.

1⅛-inch, rotary: Compound gauge, 45; pump, 115; nozzle, 40; g.p.m., 237. Centrifugal: Intake line, 47; pump, 105; nozzle, 36; g.p.m., 224; total, 461. R.p.m., 79 per cent.

1⅛-inch, rotary: Compound gauge, 62; pump, 120; nozzle, 42; g.p.m., 243. Centrifugal: Intake line, 60; pump, 115; nozzle, 42; g.p.m., 243; total, 486. R.p.m., 81 per cent.

The above figures are interpreted as showing that, under the conditions given, a 40 lbs. residual hydrant pressure would be enough to enable the machine to give two good 1-inch streams, better than the so-called 200 g.p.m. "standard" quality; but that for 1⅛-inch streams, the residual pressure should be at least 65 lbs. to give "standard" 250 g.p.m. streams, although those produced were effective fire streams as they were, lacking only 7 gallons each of reaching "standard."

Experienced fire fighters present pronounced the demonstration not only interesting, but a success. The writer, who has experimented with the machine in 2-pump operation at draft several times in the last two years, is of the opinion that a similar arrangement on a later type of machine having a motor of higher speed than that of the 20-year-old Reo would be productive of much better results and that, in general, a new field in fire engine hydraulics is now open to experimentation.



Four streams with ¾-inch tips, 2 streams from each pump, give 499 g.p.m., of which 258 g.p.m. were from the front-mounted centrifugal pump.

Greatest discharge obtained from this little dual pumper was at the total rate of 615 g.p.m. Some 350 g.p.m. was a discharge of 250 g.p.m. (see illustration below). A 1⅛-inch stream from the 300-gallon rotary pump gave 254 g.p.m., while two 1-inch streams from the centrifugal pump gave 361 g.p.m.

FIRE FIGHTING CALLS FOR HIGH STRATEGY

BY EVANS CLARK

Permission through the courtesy of the *New York Times Magazine* and Evans Clark, author

THE movements of an army in battle are followed by a corps of correspondents and special writers. Volumes upon volumes have been written about military strategy, but the story of the battle against fire, the strategy of fire-fighting, has gone largely unrecorded. The stakes may not be as great — although the existence of a city often hangs in the balance at a great conflagration — and the casualty lists are not as long; but action and danger are there, action that calls for the same combination of brains and brawn, the same qualities of daring and physical doggedness as an engagement at arms.

In some ways the strategy of fire-fighting taxes the genius of man as a military engagement rarely does. It has been said that when Germany declared war against France, Field Marshal von Moltke sent a telegram and went to bed. The entire campaign had been worked out beforehand through years of patient preparation: The terrain was known to the square foot, the forces to be met with could be predicted with almost mathematical certainty, every possible move of the enemy had been discounted, every subordinate officer knew precisely what to do when "the day" should arrive. The entire military machine was loaded and aimed. All the commander had to do was pull the trigger.

Granted that the story is overdrawn, it points an interesting comparison. The Fire Department commander cannot possibly work out his strategy until he arrives on the scene of the engagement. He has no idea where the action is to take place until the bell in his office taps out the number of the fire box — and even then the blaze may be in any one of half a hundred buildings. Nor can he gauge ahead of time the strength of the enemy's attack. When he reaches the scene he may find a bonfire in the street that can be dashed to nothing with a splash from an extinguisher or he may find an entire building a mass of fire that reaches out on every side for further fuel and a score of lives may be hanging in the balance. Where an army officer has years to plan his campaign, the fire chief's plan must be formulated literally in an instant.

More than that: The very nature of fire puts a staggering premium on quickness of decision. The enemy the fireman faces increases in strength with a rapidity that varies directly with the passage of time — until it is under control. Time is of the essence of fire fighting. The longer it takes to control a fire the more difficult it becomes to control. Were the public as fully aware of this as the firemen, there would be less grumbling when fire apparatus goes hurtling through traffic in a dizzy, headlong rush.

Businessmen in New York City have still a vivid memory of the Equitable fire. It consumed a square block in the heart of the financial district and seriously threatened to become a general conflagration. It took four hours of the hardest kind of fighting to bring it under control; and to do it required about fifty companies of firemen summoned from two boroughs.

The late New York Fire Chief John Kenlon — whose first big fire this was as chief of the department — says that the entire plan of campaign against it was formulated 30 seconds after he arrived on the scene, and "from that plan," he remarks, "I never deviated." From the time the gong first hit the alarm on which he "rolled" until he had reached the fire, and perfected his plan for fighting it, exactly six minutes had elapsed. That six minutes, be it noted, included time for waking up and dressing. Von Moltke went to bed befor the fighting began, the fire chief is often aroused from deep sleep and catapulted into the decisive moment of a great battle without a moment's warning.

Consider what this means. Follow the course of a typical fire in the old loft building section of downtown Manhattan — the district that lies along Greene, Mercer and Wooster Streets between Canal and Fourth Streets, where some of the most dangerous engagements are fought. After business hours these blocks are completely deserted; one of the sights of New York is to walk through this neighborhood in the evening. As far as the eye can reach there is often not a sign of life save an occassional prowling cat. The quietness assumes an almost menacing tone, so sharp is the contrast to the teeming activity of a few hours before. And when a fire breaks out the menace becomes a grim reality. The flames often smolder for hours before they are detected, and when the firemen arrive they find fire ready to burst into the street from cellar to roof.

Holding the Third Line of Attack
Gardner Roberts

In this instance a policeman on beat detects smoke oozing from the first floor windows and cellar coverings of a seven-story wholesale dry goods house. He turns in an alarm from the nearest street box. In less than five minutes a fair-sized battery of fire-fighting equipment has shriekingly made its way to the scene — four engine companies, two hook-and-ladder companies, a rescue company and a water tower. With them come two battalion chiefs and a deputy chief of the department. But a great deal has happened in those five minutes.

The first company to arrive is the hook-and-ladder truck from Mercer Street. By rules of the department the captain of the first company at the scene takes command at the fire until a chief arrives. By this time the smoke has burst one of the windows of the first floor and has flooded the street with a pungent blanket of fog. The truck captain running up takes stock of the scene. A glance tells him that although the smoke comes mainly from the first floor, the fire is probably still only in the cellar: He has seen hundreds of fires that looked that way at the start.

Rule number one of fire-fighting strategy is to find out precisely where the seat of the fire is and get water on it. If a building is charged with smoke, that rule has a corollary — "ventilate." The truck captain acts on it automatically. He orders his men to smash the big plate glass windows on the street floor and to open up the cellar doors and dead-lights. Crash and smash — the windows go in. The firemen are almost blown off their feet by a rush of smoke that fairly explodes into the street. A couple of quick blows with a sledge and the iron cellar doors are raised. Out of them bursts another flood of smoke.

There is a separate science of smoke that every fireman must learn. The smoke which comes from the first floor is black and heavy, but that from the cellar has an ominous light-brownish look and it comes out as if it were impelled by high pressure from behind. It is also hot. The captain's diagnosis is correct. The seat of the fire is in the cellar.

By this time an engine company has arrived. The truck captain orders it at once to "stretch in" — to connect with the high pressure hydrant and to string out the hose to the front of the building. Another truck company comes running up. It is ordered to break into the adjoining building, make its way to the back court and "ventilate" the rear of the building on fire.

After the second truck comes a battalion chief. The captain in charge, in a few brief words, tells the Chief where the fire is and what he has done about it. The Chief then assumes command and, in turn, gives it over to the deputy chief, who comes in a moment later. There is always a supreme command at every fire, and below it a hierarchy of authority that is respected with military precision.

International

Closing in on a Smokey Fire over Ladders and Stairways

When the deputy arrives he gets a quick picture in his mind of just what the situation is. His driver, sent to the rear to investigate, reports that the smoke there looks as if the fire was in full possession of the cellar — every Chief has one or two aids who do this sort of reconnoitering and who carry orders for their commander. The situation is serious.

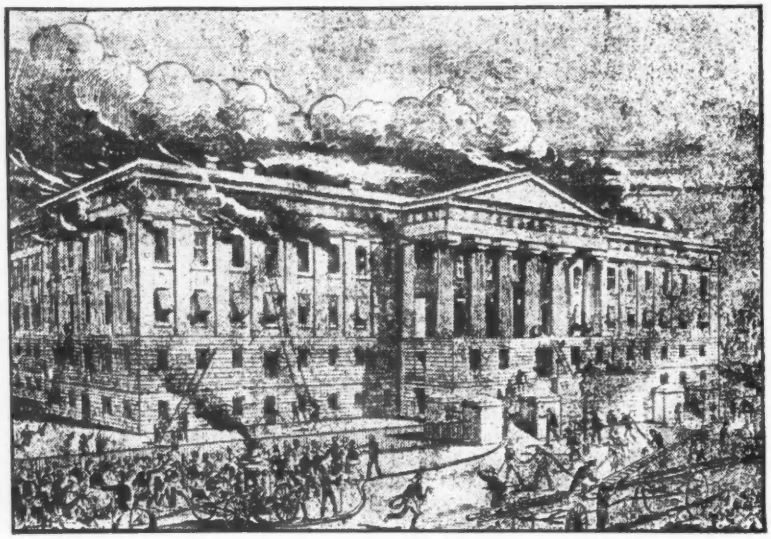
The Chief, in an instant, takes account of stock. The building is an old one — a "quick burner" with plenty of wood in its construction. It covers a large area, almost a quarter of a block. And it is now resting on a volcano of fire. The chances are strong that his men will not be able to hold the fire to the cellar; there is still too much smoke to make an entrance.

He at once deploys the forces he has at hand — all the companies summoned on the first alarm have arrived. The truck men are at work opening up the cellar and first floor. He orders the three other engine companies to stretch in, two in front of the building and one through the adjoining building to protect the buildings in the rear should the fire break out there. Then he orders his aid to turn in a second alarm. In a few seconds another battalion of fire apparatus bursts noisily on a quiet city and races to the scene — five more engine companies and another hook-and-ladder truck.

Before any of the second alarm companies arrive, however, the Chief of department, whose quarters are nearer by, reaches the scene and takes over supreme command from the deputy, who gives him a brief report of the situation as he sees it. The critical moment has arrived. The Chief's problem is hydraheaded. He must concentrate his first line of attack and build up a second and even a third in case the first will not hold. Each one has its difficulties to be met. He must think fast,

(*Continued on page 26*)

The Battle Lines Have Been Completely Laid Out *Chicago Daily News*



"The firemen reached Washington and were received by cheer after cheer by the citizens. The apparatus immediately proceeded to the scene of the fire, arriving in ample time to render valuable assistance."

The Great Patent Office Fire of 1877

Like Many Other Noted Landmarks This Great Government Building in Washington, D. C. Would Not Be Standing Today but for the Valor of the Old-Time Firemen

WHEN the average citizen views the imposing landmarks of American cities he seldom realizes that many of these great structures would not stand today but for the valor of America's fire fighters down through the years. A typical case in point is the great old Patent Office Building, covering two city blocks in downtown Washington, D. C., more recently housing the U. S. Civil Service Commission. Like many other great structures, this notable public building had its ordeal by fire many years ago.

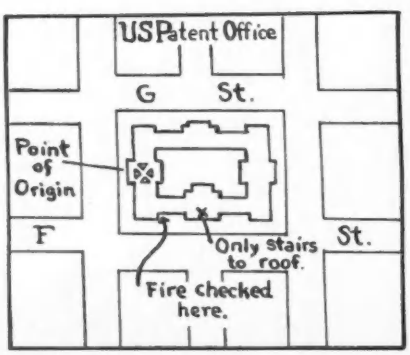
Congress first authorized the erection of the Patent Office in 1836 and that part which faces on F Street, Washington's main shopping thoroughfare, was completed in 1840, more than one hundred years ago. Its well-known south portico was an exact copy of the famed Parthenon in Athens. The 7th Street side was completed in 1852; the 9th Street side, where the great fire started, was completed in 1856. The rear on G Street side was finished in 1867. The building cost $3,000,000, a very large sum in those early days. It is 403 feet long and 274 feet wide, north to south.

The fire, here described, destroyed thousands of models of early inventions by American inventors. At that time a model had to be submitted for each invention, in addition to the usual plans and specifications. The fire also destroyed countless valuable records, as it occurred long before the establishment of the U. S. Archives Office as a depository for official documents and records.

At the time of the fire, the District of Columbia Fire Department consisted of only 6 steam fire engines and 1 ladder truck. It has since grown to 30 engine companies, each with 2 pumpers, and 15 aerial ladder companies, plus many auxiliary units. However, a considerable force was assembled to fight this fire. Through the workings of mutual aid, help was obtained from Baltimore, Maryland, and from the U. S. Navy Yard in Washington. One account says that horse drawn apparatus also responded over the road from the Alexandria, Virginia, Volunteer Fire Department.

The *Firemen's Record*, published some fifty years ago in Washington, D. C., gives a graphic account of how this big fire was handled:

"At 11:30 A.M., September 24, 1877, an alarm was received from box 131 (then located at the corner of 12th and G Streets, N.W.) The first alarm engines responded with their usual promptness, what was their surprise when they saw that the Patent Office was on fire. The Chief Engineer arrived on the ground in about 5 minutes after the sounding of the first alarm. Upon his arrival he at once surmised that the fire had originated under the roof, about the middle of the West or Ninth Street wing. He immediately summoned the remaining companies in the city as the fire had gained great headway.



"At this time the fire was confined to the 9th Street wing in what may be termed the loft or attic of the building, a space between the ceiling of the third or museum floor and the roof. The space was about 12 feet high and sloped to about 4 feet to the sides. It was stored with a very large quantity of inflammable matter, to which was added the dry pine rafters and sheathing which supported the copper roof, making it an easy prey to the flames.

"This attic, like the large halls beneath it, traversed the entire building; in other words, at no point were there partition walls or other impediment to stay the progress of the fire. This immense area, with its low ceiling, of necessity created a terrible draft and notwithstanding the wind was from the south, the fire burned in every direction, but with greater rapidity towards the south, or directly against the wind, reaching the F Street wing some 20 minutes before it did the G Street wing.

"A company was at once ordered to the roof, when just as they gained it the discovery was made that there was but one outlet from it. This was on the F Street front over the main portico reached immediately from a room used for storing specifications and drawings of which there were nearly 8,000,000, aggregating in weight over 200 tons. The stairway being a narrow wooden concern liable to ignite from the heat at any moment.

"The room spoken of was reached by double flights of fancy iron stairs rising from the museum. A glance showed that

this stairway must be saved, as it was the only means of retreat for the men then on the roof, and that in order to save the stairs the fire must not be permitted to get into the F Street wing.

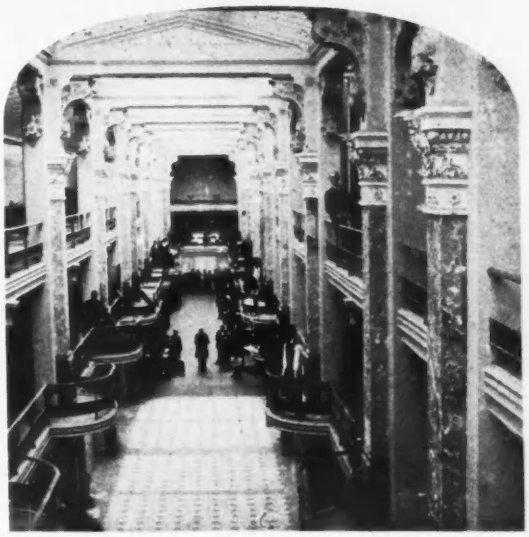
"To this end four of the companies — 1, 2, 3, 4, as fast as they arrived were placed at the point where the 9th and F Street wings unite. Their efforts were not in vain as the fire was checked at this point.

"At this time all the possible apparatus, including that from the Washington Navy Yard, were at work and it was deemed advisable to ask for assistance from Baltimore. Shortly after 12 o'clock Mr. Thos. M. Bryne, one of the Washington Fire Commissioners, telegraphed to Baltimore for aid. Upon receiving the dispatch in Baltimore, box 13, which was located at B. & O. R.R. depot, was sounded, and the firemen responded promptly. They were informed of the call from Washington and no time was lost in getting quickly the apparatus on board the cars.

"Engines 1 and 2, with their hose carriages and an abundance of hose were detailed. At 1:05 the train moved amid the cheers of a multitude of citizens who were congregated around the depot. The firemen reached Washington shortly after two o'clock and were received by cheer after cheer by the citizens. The apparatus immediately proceeded to the scene of the fire, arriving in ample time to render valuable assistance.

"A second dispatch was sent for more engines and two more companies were detailed to go; Engine Companies 3 and 4, left at 1:45. This train arrived at 2:41 P.M., having made the run of forty miles in fifty-four minutes. At every station on the way the firemen were greeted with cheers.

"When the train arrived, cheer after cheer greeted the firemen as they disembarked. Companies 1 and 2 took up their positions at the corner of 6th and H Streets, and 5th and H respectively, and were in time to go to work. Previous to the arrival of engines 3 and 4, while the Patent Office was still burning, another threatening fire broke out on G Street. The Patent Office demanded the attention of our own department. It was a critical moment, for it seemed certain that a vast amount of property would be destroyed. Engines 1 and 2 from Baltimore came to the scene and prevented the fire from spreading. It was about this time that companies 3 and 4 arrived, and the fire, with their assistance, was soon under control.



Interior View at about the time of the fire.

"As the Baltimore firemen were getting ready to go home, Secretary Carl Schultz sent for Chief Hennick and requested him to bring his men into his office, so that he could thank them personally. The firemen soon assembled: the Chief introduced the Secretary, who said: 'Gentlemen of the Baltimore Fire Department, it is my duty and pleasure in the name of the Government to thank you for the valuable aid that you have rendered us today. You probably are not aware how great the service you have performed. Had it not been for your aid, many records of incalculable value to this department would have been lost. When we called you, we did not call in vain, you came with the speed of lightning and in the nick of time, and rendered inestimable service both to your country and the City of Washington, and for which you will ever have our thanks.'

"The firemen gave three cheers for Secretary Schultz, and the Washington department. In return, cheers were given with a will for the Baltimore firemen. The firemen then took their places on the apparatus and were driven through a number of streets, and were received with cheers from the citizens. After parading the principal streets the firemen arrived at the depot, where the last good-bye was said, and the embarkation for Baltimore took place.

"Necessarily this fire in a great government building, created the most intense excitement, and at a very early period, after its discovery, not only the streets in the vicinity, but the halls and corridors were thronged with citizens and employees, each anxious to render such assistance as he could; but as is usual in such cases, none doing any real service for the reason that there was no unity of purpose or action.

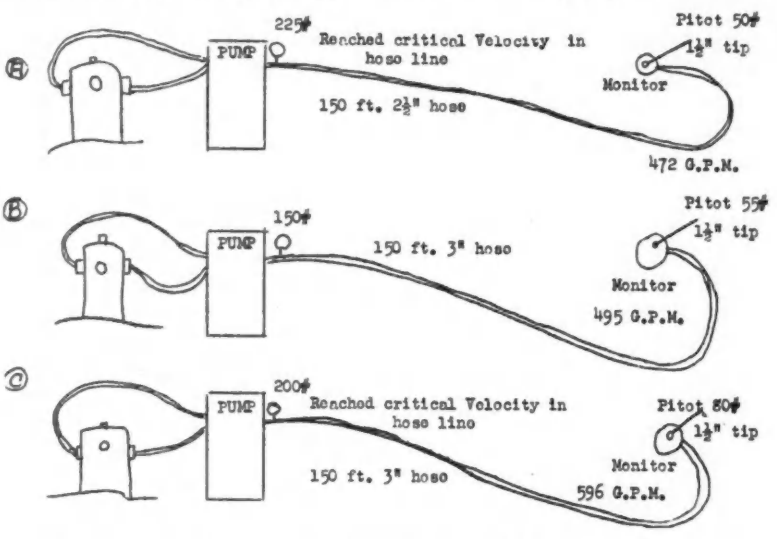
"The officers and members of the department, without exception, maintained their well earned reputation for courage, judgment and skill during the incessant and arduous labor of the day. They were ever at their posts, facing danger unflinchingly, and demonstrated by their actions that they could, at all times, be relied upon to do their whole duty."

TESTS WITH THE MONITOR NOZZLE

THIS month we present three more of the fire stream experiments conducted at the Oklahoma State Fire College last summer under the direction of Oklahoma State Fire Instructor George Orgain. While space in VOLUNTEER FIREMEN does not permit us to show all of these tests, it should be clear that it is quite possible to check up on theoretical fire stream calculations by making careful observations of actual fire stream layouts.

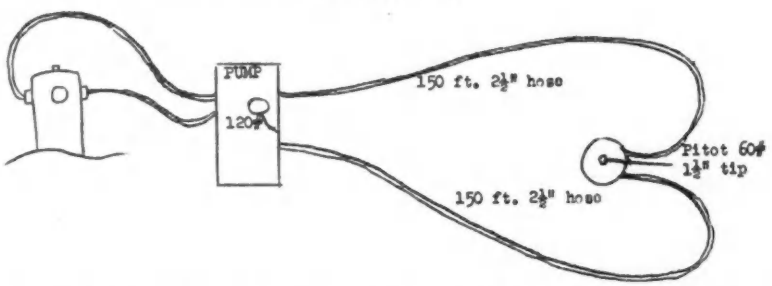
The first problem here presented was designed to find out the advantage of 3-inch hose over 2½-inch hose when supplying a heavy stream such as that from a monitor nozzle. To get 50 pounds nozzle pressure through a 1½-inch monitor nozzle tip supplied by a single line of 2½-inch hose, a pumper pressure of 225 pounds was required. This was because the 472 g.p.m. discharge from the nozzle gave approximately 150 pounds friction loss in the three lengths of hose used to supply the nozzle. When the same nozzle was supplied by a single line of 3-inch hose it discharged 495 g.p.m. at 55 pounds pressure with a pressure at the pump of only 150 pounds, or a decrease of 75 pounds pressure at the pump made possible by use of 3-inch hose. With a single line of 3-inch hose it was possible to get an 80 pound 596 g.p.m. stream with a pump pressure of 200 pounds. From these figures it will be understood why most large cities use 3-inch hose to supply heavy streams. Two 2½-inch lines would have to be used to supply a monitor nozzle where 3-inch hose is not available.

Problem: To compare the capacity of 2½ and 3-inch hose when supplying a monitor nozzle.



It was observed from the tests outlined above that 3-inch hose will deliver more water than 2½-inch hose. This permits a much better fire stream at lower engine speeds and pressures.

Problem: To find the friction loss in the monitor used and also to check the friction loss tables for master streams.



The friction loss in the monitor employed in these tests was found to be 20 pounds per square inch. This seems quite high with a nozzle pressure of only 60 pounds through a 1½-inch tip.

LARGE quantities of water passing through a monitor nozzle or other heavy stream device cause a loss of pressure. The pressure loss in some nozzles is considerably greater than in other types where the waterway is less constricted and sharp turns in the direction of flow are avoided. In most fire stream problems it is common to allow for 5 pounds pressure loss in a monitor or turret nozzle.

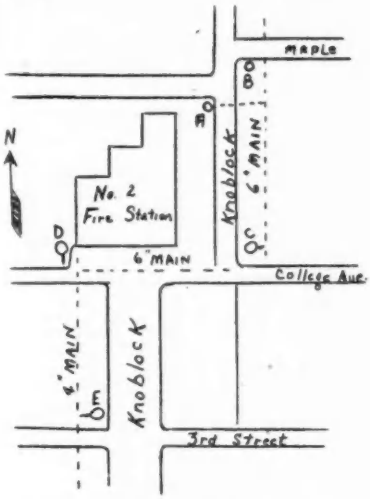
In this test the pumper operating at 120 pounds supplied a monitor nozzle discharging at 60 pounds. Thus it was known that 60 pounds pressure had been lost in the two lines of hose and in the nozzle. The 60 pounds nozzle pressure through a 1½-inch tip would give about 520 g.p.m. With siamesed lines supplying the monitor, this flow would result in a friction loss of 16 pounds per 100 feet of hose, or 24 pounds friction loss in 150 feet of hose. As there was a known loss of pressure of 60 pounds between the pump and the nozzle, and 24 pounds of this pressure loss was known to be due to friction in the hose, it is obvious that there was 36 pounds additional pressure loss to be accounted for elsewhere. While some of this might be due to more than average friction loss in the hose, elevation and other factors, it was concluded that there was at least 20 pounds friction loss in the monitor nozzle used.

As a further check on the loss of pressure in the monitor nozzle, the nozzle pressure was stepped up to 79 pounds which would give 593 g.p.m. with the 1½-inch tip. This required an increase in engine pressure to 138 pounds. This flow would give a friction loss of about 31 pounds in siamesed lines of 2½-inch hose. This, added to the 79 pounds nozzle pressure, would leave 28 pounds pressure loss to be accounted for; presumably, most of which was due to the design of the monitor nozzle used.

It should be borne in mind that the observations here reported are based upon Pitot tube readings which may vary several pounds if the Pitot tube was not held in exactly the right spot each time while making the readings. Also the nozzle tip used, while nominally 1½-inches in diameter, may have been slightly larger, which would have accounted for a greater flow and increased friction loss. A more accurate method of determining the friction loss in the monitor nozzle would have been to have placed a gauge at each intake and another gauge on the nozzle just below the tip. However, this would have been more difficult to arrange and the method used was entirely satisfactory for the purpose of showing that there is a considerable pressure loss in this monitor nozzle.

THE final demonstration here presented is intended to show that sudden opening and closing of a nozzle causes pressure fluctuations and surges that may be dangerous to the water system as well as to

Problem: To observe the effect on a water system when a nozzle or valve is quickly opened or closed.



Hydrant A — Capped gauge placed on one 2½-inch hydrant outlet and 50 feet of 2½-inch hose with 1⅛-inch tip on shut off nozzle used on another outlet. Capped gauges were also placed on Plugs B, C, D and E, to observe the effect of pressure fluctuations.

RESULTS

Hydrant	*Static Pressure p.s.i.*	*Residual Pressure p.s.i.*	*Quick Opening Results p.s.i.*	*Rapid Closing Results p.s.i.*
A	45 lb.	36 ln.	27 lb.	79 lb.
B	45	42	25	81
C	45	41	30	83
D	43	43	33	75
E	43	42	38	50

Gradual closing of nozzle produced only 48 lbs. pressure on Hydrant A, and 55 lbs. on Hydrant B.

firemen and their hose. For this demonstration, pressure gauges were placed on the outlets of five hydrants and a line of 2½-inch hose with a 1⅛-inch shut-off nozzle was connected to one of these hydrants. The hydrants were on 6- and 4-inch mains. Before the hose stream was used, the pressure at the various hydrants was 43 to 45 pounds. With the single fire stream flowing, the pressure did not drop over 4 pounds at any of the hydrants except the one supplying the hose stream and that dropped only 9 pounds. Then the nozzle was opened quickly to see what the results would be as shown by the pressure gauges at the various hydrants. It was found that the sudden starting of the flow caused momentary pressure losses varying from 5 pounds at the most distant hydrant, to 18 pounds at the hydrant to which the hose was connected. In some situations where pressures are normally low, such a fluctuation might cause collapse of hot water tanks in nearby houses, or might cause a pumper at some other hydrant to lose its suction if they were operating at nearly the capacity of the hydrant.

Next the stream was shut down suddenly at the nozzle. Pressures at nearby hydrants surged up between 39 and 43 pounds above the pressure readings obtained when the water was flowing. At the most distant hydrants the surge amounted to 32 pounds and 8 pounds respectively. The 8-pound reading was at a hydrant on a 4-inch main more than two blocks away and it is likely that this small pipe restricted the effect of the surge to some extent.

These observations should make it clear that the flow of water should always be turned on and off with care. Sudden closing of a nozzle or hydrant may cause a water main to fail at a critical time.

WYOMING COUNTY, N. Y., FIRE SCHOOL

THE Underwriters Rating Board recently conducted a fire school in Wyoming County, in western New York state. Manager Edward F. Curren reports that more than 90 per cent of the fire departments within the county sent representatives. This school is the first in the eastern part of the United States to be sponsored by an insurance rating organization, and the entire cost of the school was borne by the Underwriters Rating Board. A feature on the program was an entertainment given to the visiting firemen by the Warsaw, N. Y., Fire Insurance Company, members of the Underwriters Rating Board.

The subjects taught at the school included: Apparatus, Tools and Equipment, Their Use and Care; Ropes; Ladders; Care and Use of Fire Hose; Size-up; Forceable Entry; Ventilation; Overhauling; First Aid Fire Extinguishers; Electrical Hazards; Fire Pumps; ending with a review session.

The instructor was Chief Howard Keeler, who served as a State Fire Department Instructor for 3 years until the state fire department training program was suddenly abolished by Governor Dewey last year. Chief Keeler, who is now chief engineer with the Underwriters Rating Board, is a graduate of Carnegie Institute of Technology, and for more than 12 years was chief of the fire department in Canisteo.

As was the practice in the fire schools under the auspices of the former New York War Training Program, considerable equipment was used by the firemen with class participation in each evolution. During the progress of the course, a chief of one of the communities in Wyoming County, after using one of the model towers for demonstrating principles of ventilation in class, came to the school and told the group that his department encountered a ventilation problem which was the duplicate of the one used in the class. According to this chief, the fire was handled in a much better fashion and with considerably reduced fire loss because of what he and his men had learned at the school.

The enthusiasm with which the course was received has been evidenced by the demand for more schools as fast as arrangements can be made.

Chief Charles Vogel, who also served in the New York State Fire Defense Training program, is now with the Underwriters Rating Board, in the Public Protection Division.

Chief Curren and the entire staff are devoting a great deal of time to assisting the smaller communities of the state with their firemanic problems. This is done "as a public service to the fire departments of New York state in return for the wonderful assistance which has been afforded to all insurance interests for many years past."

Efforts are under way, among the firemen of New York State, to urge the 1945 session of the New York legislature to reestablish the fire training program as a permanent feature of the State Education Program. This would be in line with the practice in most other states. The Legislative Clearing House of the New York State Firemen's Association met in Hudson, N. Y., on December 3rd, and voted unanimously to introduce such a bill.

RESEARCH ON FLAMEPROOFING FABRICS

by 15-Year-Old Girl Scientist

Nancy A. Durant was awarded a $400 Westinghouse Science Scholarship in the Third Annual Science Search in 1944, thus being named one of the most promising young scientists in the United States. Miss Durant was among the 40 finalists chosen from 15,000 high school entrants. She is also the first of her race to win a Westinghouse Science Scholarship. In 1944 she was presented the Weatherless award for being the most outstanding student of science among all the graduates of colored high schools in the District of Columbia. Miss Durant plans to become a research chemist and is studying at Radcliffe College in Cambridge, Mass.

UNDER the direction of her high school science teacher, Nancy Durant made a study of numerous fire retardant materials. Finding that laundering or dry cleaning tended to detract from the material's flameproof qualities, Nancy set out to make a better solution in which garments or bolts of cloth can be dipped.

It was difficult to secure enough tungsten trioxide — an important chemical in the formula — because of wartime demand for it, but Nancy's ingenuity came into play. She invented a bulb crushing machine in which she crushed the school's burned out light bulbs and extracted the tungsten filaments, thus adding to her slim supply of the chemical. Nancy learned from her research that cotton and rayon cloth, when treated with a 10% solution of sodium tungstate, remained flameproof after five cleanings and three launderings.

In Miss Durant's essay, "Flame-Proofing Fabrics," which follows, it is easy to realize the important part chemistry plays in the work of fire prevention.

"MY science project is centered around the development of appropriate methods of flameproofing paper and cloth. I was motivated into undertaking this project by the occurrence of the tragic 'Boston Cocoanut Grove' fire, resulting from the use of flammable decorations. This catastrophe brought the problem of flameproofing to the mind of the entire nation.

"While we were discussing the Boston fire in our chemistry class, I was assigned to the investigation of the relative merits of various materials which are known to impart fire-resistant properties to paper and cloth. Among the substances tested were aqueous solutions of (*a*) boric acid and borax, (*b*) boric acid and ammonium sulfate, (*c*) ammonium sulfate, (*d*) ammonium chloride and ammonium sulfate, (*e*) potassium alum, borax, and boric acid, (*f*) ammonium chloride, (*g*) ammonium sulfamate (*h*) a widely-used proprietary fire retardant compound and (*i*) borophosphate resin.

"The solutions were prepared carefully. Rayon cloth, cotton cloth, and filter paper were then immersed in the solutions. Four pieces of each type cloth and two samples of paper were used with each solution. One sample of cloth and one of paper were used as controls, that is, they were burned without treatment with the solution so as to provide some basis for judging the fire-resistant properties imparted by the substance being tested. The other piece of paper and one sample of each type cloth were burned after treatment with the solution. One sample of each type cloth was burned after dry cleaning and the last piece of each type cloth was burned after laundering.

"The results of these tests were displeasing in that all of the solutions made the paper and cloth stiff. With the exception of the materials treated with ammonium sulfamate and the proprietary compound solutions, the non-flammability of the treated materials was greatly reduced after dry cleaning. None of the cloth retained any noticeable flame-resistant properties after laundering.

"When these findings were reported to my instructor, he suggested that I investigate the properties of other salts known to make materials flame-resistant. During this research, I found claims made for stannic (tin) salts and soluble tungstates. These claims reported the salts mentioned above to impart to cloth properties of flame-resistance which remained after several launderings.

"The school storeroom contained no stannic compounds. However, there was plenty of metallic tin. Preliminary attempts to prepare stannic nitrate by using metallic tin and concentrated nitric acid yielded stannic oxide, stannous oxide, stannous nitrate and very small percentages of stannic nitrate in an almost inseparable mixture. The development of a suitable laboratory procedure for the preparation of stannic nitrate is still being worked out.

"Looking up the preparation and properties of various tungsten salts, I found that sodium tungstate was the only tungsten salt suitable for making materials non-combustible and that it was prepared fairly easily. One method of preparing sodium tungstate calls for the use of tungsten trioxide and sodium hydroxide. While the sodium hydroxide was plentiful, the tungsten trioxide was not easily obtainable.

"Our school is fairly large and we use many electric light bulbs each week. It is a simple matter to collect these used bulbs and to remove the tungsten filaments from them. Last spring the bulbs were broken by hand but this fall I developed a bulb-crushing machine as a project supplementary to the unit on mechanisms in the 'Fundamentals of Machines' course. This machine consists of a toggle mechanism and a wheel, slotted arm, a sector of a spur gear, and a length of rack. The toggle mechanism crushes the bulbs and the toothed mechanism moves the base of the machine back and forth, freeing the filaments from the lead wires. If a machine of this type is used in connection with the salvage it would prove convenient, though costly, to dump the crushed bulbs into a container of concentrated nitric acid since this acid reacts with all of the metals in the bulb except the tungsten.

Science Service Inc.

Nancy A. Durant

"After the tungsten filaments are collected, they are heated to redness in an open-crucible. $2W + 3O_2 \rightarrow 2WO_3$. Under these conditions most of the tungsten is converted into tungsten trioxide which is then purified by the use of hot concentrated acid or aqua ammonia. Sodium tungstate is precipitated from the concentrated solution by adding the tungsten trioxide to the saturated solution.

$$WO_3 + 2NaOH \rightarrow Na_2WO_4 + H_2O$$

The sodium tungstate precipitates out and is separated by filtration.

"Another process for making sodium tungstate was developed by William B. Stoddard and Irving Hochstadter and patented in March, 1922. This method of preparing the salt calls for the use of 500 parts of tungsten or tungsten ore, 330 parts of sodium nitrate, 75 parts of charcoal, 38 parts of sodium silicate solution and 13 parts of water. These ingredients are pulverized and mixed intimately. The mixture is then ignited. The sodium tungstate is recovered by lixiviation (*to separate by mixing with some solvent.* Ed.)

"In these experiments the first process proved simpler than the Stoddard-Hochstadter method. Nevertheless, the Stod-

(*Continued on page 24*)

A.D.T

Electric Protection Services

FIRE • BURGLARY • INTRUSION • HOLDUP • SABOTAGE

American District Telegraph Company (A.D.T. System) is the only nation-wide organization specializing in electric protection services. A.D.T. manufactures and installs electrical protection systems to safeguard lives and property against the hazards of fire and unlawful intrusion. Systems also are provided for the supervision of watchmen and guards and of certain industrial processes. The protection equipment within each customer's premises is connected with an A.D.T. Central Station where skilled attendants stand constant vigil and respond to alarms by dispatching armed and bonded private guards, the police, the fire department, or by initiating whatever other action may be required by the nature of the emergency. In localities where Central Station service is not available, the protection system usually may be connected to the local police or fire department.

FIRE PROTECTION SERVICE

• ***Sprinkler Supervisory and Waterflow Alarm:*** Automatically detects and reports trouble conditions (whether caused maliciously or otherwise) that might impair the sprinkler's effectiveness. Automatically summons the fire department the instant a sprinkler head opens or in case of a serious leak.

• ***Aero Automatic Fire Alarm:*** (For unsprinklered areas, or in conjunction with sprinklers.) Automatically detects fire when it starts, and automatically summons the fire department.

• ***Manual Fire Alarm:*** Available in various types—for summoning the fire department, for sounding local alarms to warn occupants, or performing both functions.

• ***Automatic Fire Control for Air Duct Systems:*** Provides automatic fire and smoke detecting and reporting devices for air conditioning, ventilating and other air duct systems. Automatically closes dampers, stops fans, etc., and summons the fire department.

INTRUSION DETECTION SYSTEMS

• ***Burglar Alarm:*** Protection for doors, windows, skylights, etc., by means of electrified screens, foils and similar devices.

• ***Holdup Alarm:*** Provides means for transmitting a silent signal to summon police in case of holdup or other emergency.

• ***Invisible Ray Alarm (Photoelectric):*** Projects beams of invisible light across indoor or outdoor areas. Interruption of beam by any person or vehicle results in an alarm.

• ***Telapproach:*** Establishes an electronic field and produces alarm upon approach of any person into the electrical field.

• ***Phonetalarm:*** A sound detection system especially adaptable for protection of vaults containing valuables such as specie, securities, confidential plans and documents, narcotics, gauges, tools, etc.

• ***Emergency Police Call:*** Provides means for summoning police direct to premises in case of emergency.

PATROL SUPERVISION FOR WATCHMEN AND GUARDS

• ***Central Station Watchman's Reporting Service:*** Provides signaling stations electrically connected to the A.D.T. Central Station to which the watchman reports at prearranged intervals. Failure to signal is immediately investigated.

OTHER A.D.T. SYSTEMS

• ***Heating System Supervision:*** Electrically supervises temperature, flame failure, oil supply, vacuum, pressure, humidity, current supply, pilot safety, automatic stoker. For coal, gas or oil fired systems.

• ***Industrial Process Supervision:*** Electrically supervises temperature, humidity, power, water supply, etc., in various industrial processes such as mixing, cooking, drying, cold storage, etc.

The benefits derived from A.D.T. Protection are far-reaching....May we tell you how it can benefit you? Write our Executive Offices, 155 Sixth Avenue, New York, N.Y., for free descriptive booklets.

A.D.T

Controlled Companies of **AMERICAN DISTRICT TELEGRAPH CO.** *155 Sixth Avenue, New York, N. Y.*

CENTRAL STATIONS IN ALL PRINCIPAL CITIES OF THE UNITED STATES

FMC HIGH-PRESSURE TESTS
AT ENDICOTT, N. Y.

Tests Conducted by Local Firemen

RAGING FIRE KNOCKED DOWN IN ONE MINUTE!

Less Than 70 Gallons of Water Used!

The tests at Endicott, N. Y., are vital to all fire departments, both city and rural. First: they were set up and conducted by the local Chief and extinguished by his firemen (and it was their first experience using high pressure on fires) — *not by factory representatives.* And secondly: because they showed the real value of FMC High-Pressure Fog under actual fire-fighting conditions.

These were unusually hot fires. The house, which was tinder-dry, was set on fire several times with gasoline and oil.

As the flames rolled up, the *local* firemen moved in with two FMC Fog Fire Fighter Guns. And — *the big House Fire of the Series was knocked down in one minute, with less than 70 gallons of water.* There was no water in the cellar after the last of the 4 fires was out.

Various inflammable liquid fires were touched off and extinguished efficiently with FMC High-Pressure Fog. Those who saw the tests recognized its real value in fire fighting.

That's the surprising thing about FMC High-Pressure Fog. Any good fireman can use it—and *use it effectively*—and use only a small portion of the water ordinarily required and with practically no water damage. Besides that you get into action immediately upon arrival at the fire and the fireman is fully protected against the heat and can move right up to the fire.

Investigate! Get the facts about this new and revolutionary fine FMC Fire-Fighting technique. When we stress the value of and the results obtainable from 600 lbs. gun pressure fog for fire fighting, naturally we base it upon our own design of fire truck, our own experience, our own positive pressure pump and our own technique. There is no question about what you get when you select FMC High-Pressure Fog Fire Fighters.

BUILDERS OF BEAN HIGH-PRESSURE

ACTUAL PROOF OF FMC HIGH-PRESSURE FOG BY ENDICOTT FIREMEN

FIGHT FIRES THE MODERN WAY

High-pressure fog for fire fighting was originated by the John Bean Mfg. Co. a number of years ago. And—since then—a system has been developed which has revolutionized fire-fighting technique.

You get action—*fast*—with the FMC High-Pressure Fog Fire Fighter. This has been proved at thousands of town, rural and airport fires.

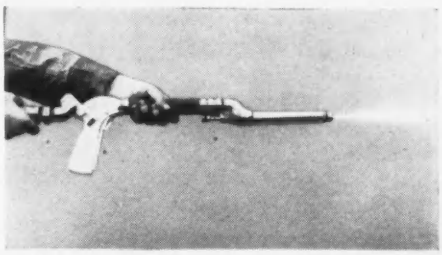
IT'S THE PRESSURE THAT COUNTS!

The FMC Fog Fire Fighter easily maintains *800 lbs. pump pressure*—better than *600 lbs. nozzle pressure.*

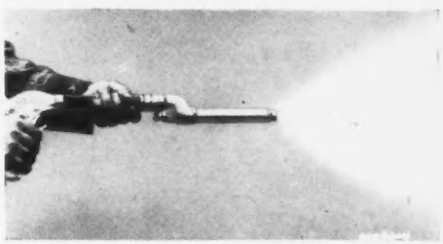
This high pressure gives you a combination of high velocity and finely-atomized fog—just what you need to *cool* and *smother* flame. Every droplet of water is broken up into thousands of tiny particles that can be *"blasted"* into the source of the fire.

THERE'S NOTHING ELSE LIKE IT!

Only the FMC High-Pressure Fog Fire Fighter packs the needed punch to produce and maintain 800 lbs. pump pressure—600 lbs. gun pressure. It's an all enclosed, positive displacement, three cylinder oil bath pump with over 10 years of high-pressure use to prove that it is really a high-pressure pump.



A ONE-MAN JOB! *With pressure on, the FMC Fog Fire Gun practically carries itself and can be poked into cellars, attics or holes in partitions. One man can fight fire with this gun and can handle one ¾-inch hose line easily.*



EASY ADJUSTMENT! *Fireman can hold trigger release with his right hand and adjust barrel with his left hand. By turning the barrel slightly, he can change the flow from a straight stream to a wide fog pattern, for close-up work. The only gun that meets all requirements.*

800 LBS. AT THE PUMP! *That's a pretty tough job for any unit. But —the FMC High-Pressure Pump* is built *to deliver and maintain that pressure. The reason? This pump—built by Bean—is different from all other pumps and is designed especially for high-pressure work by high-pressure pump engineers.*

FMC *Original* HIGH-PRESSURE FOG FIRE FIGHTER

CAN BE MOUNTED ON MOST STANDARD TRUCK CHASSIS

FOOD MACHINERY CORPORATION

JOHN BEAN MFG. CO. 726 HAZEL ST., LANSING 4, MICH. • BEAN-CUTLER DIVISION, 426 JULIAN ST., SAN JOSE, CALIF.

PUMPS FOR OVER SIXTY YEARS

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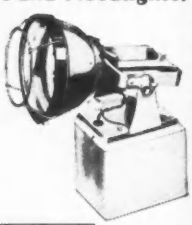
The best in colored oscillating lights for your motor equipment.

Type 06 ←
Clears Both Sides of Street

Featherweight, Mile Range, Rechargeable Hand Searchlights and Floodlights.

Type WS →
Uses Small Rechargeable Battery Mile Range



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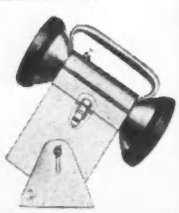
Emergency Floodlight For Theatres, Road Houses, etc.

Types F5 and Super-6 →
Dry and Rechargeable Units. ¾ Mile Range

Type T ←
Roof mounted Officers Searchlight 360°

Type T&T →
Two-Way. Hand and Red Warning Light



CARPENTER MFG. CO.
"MASTER ★ LIGHT ★ MAKERS"
168 SIDNEY ST., CAMBRIDGE 39, MASS.

The remote control console used during the successful demonstration of the use of the 118 megacycle spectrum at the Graemere Hotel, Chicago. R. V. Dondanville, Chief Communications Engineer for the Commonwealth Edison Company, Chicago, is using the "mike" to direct the movements of the three test cars used in the demonstration. Flanking Mr. Dondanville are Motorola Radio engineers Milton R. Friedberg and Joseph Nakutis.

Norman E. Wunderlich, Division Head, Galvin Manufacturing Corporation, in a test car, twenty miles north of Central station receiving directions from remote control station in Graemere Hotel, Chicago, during Motorola Radio's recent successful demonstration of the use of the 118 mgc band for two-way radiotelephone communications.

Solution for Shortage of RADIOTELEPHONE WAVE LENGTHS?

THE recent successful demonstration of the use of the high 118 megacycle frequency for communications broadcasting at Chicago by Motorola Radio Company engineers may solve the present shortage of wave lengths in the radiotelephone field. With the Federal Communications Commission swamped with requests for allocation of wave lengths by police and fire departments, railways, taxicabs and trucking companies, public utilities and other commercial and governmental concerns and not enough wave lengths left to go around, the Motorola Radio Company's demonstration appears to have the answer to the FCC's problem.

Climaxing the result of over four years of painstaking, exhaustive, often heartbreaking effort, and experiments conducted in the Kearsage and Rocky Mountains, in metropolitan and rural areas, and despite the fact that the theorists said it couldn't be done, Motorola Radio engineers, under Norman E. Wunderlich, manager of the Communications Division, Galvin Manufacturing Corporation, successfully demonstrated that two-way F-M radiotelephone communications in the 118 megacycle band between roving mobile units in Chicago's crowded streets and the central station were definitely feasible.

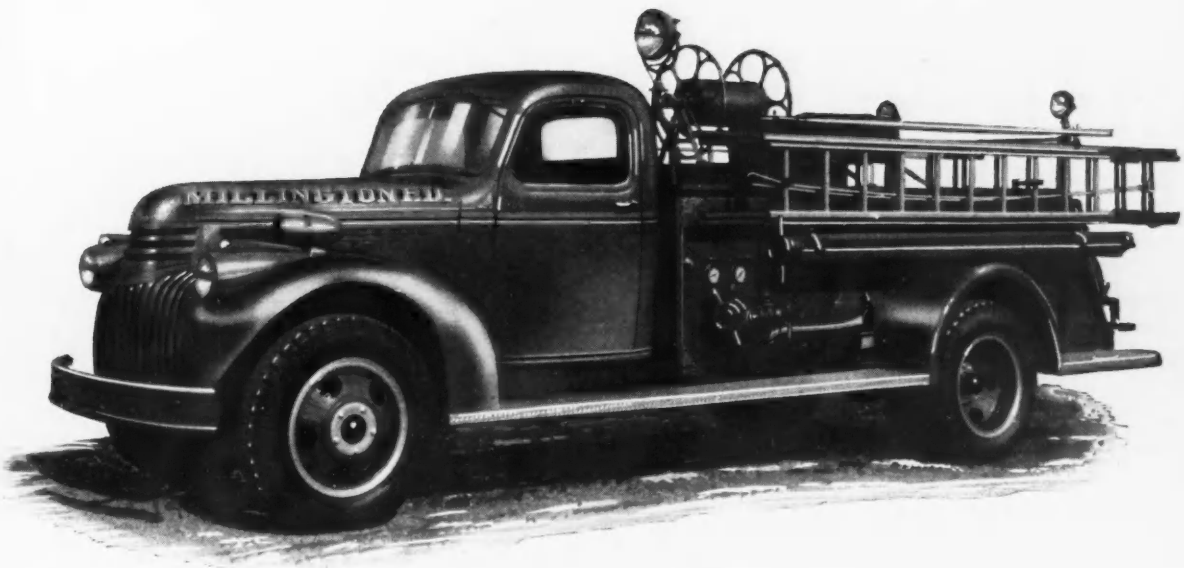
Before a group of 85 communications engineers, with R. D. Dondanville, Chief Communications Engineer for the Commonwealth Edison Company, Chicago, at the microphone and other noted communications engineers riding in the three test cars, two-way radiotelephone service was clearly, distinctly and quickly established. Even under Wacker Drive, a two level roadway of reinforced steel and concrete, in the Chicago Loop, messages were clearly received and efficiently dispatched by the test car.

To the North, South and West, the test cars travelled under Dondanville's directions and communication was solid at all times during the two hours the test ran. Station to car and car to station reception was solid for a radius of twenty miles and car to car reception was excellent short of five miles.

Broadcasting on the 118.55 megacycle wave length appeared to be somewhat superior to that on the 30 to 40 megacycle band, the frequency ranges usually alloted to police and fire departments. Certain interferences encountered in the 30 to 40 megacycle range were totally absent in the higher range. Induction frequencies emanating from ignition systems, diathermy machines, trolley wires, and other electrical sources did not interfere with either reception or transmission on the F-M 118 megacycle band. Static and other noises were entirely eliminated. The engineers present were frankly astonished and highly enthusiastic at the excellence of the performance.

In addition to the high fidelity and clarity of the 118 megacycle frequency, it was demonstrated that the signals wash out at a radius of thirty-five to forty miles, with no skip interference such as is usual on the 30 to 40 megacycle band. This washing out quality of the 118 megacycle band opens up a whole new band of wave lengths for radiotelephone service. By alloting, say, three frequencies to each hundred miles, and controlling the power output, Motorola Radio engineers believe that sufficient frequency channels may be made available to meet more than present needs.

WHERE ELSE CAN YOU GET A 500 GALLON UNDERWRITER PUMPER for $1815 (BASIC EQUIPMENT, NOT INCLUDING CHASSIS)



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IF your Fire Department is planning the purchase of a new piece of equipment we suggest you write us and explain your needs.

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We shall be glad to advise you and help you to plan the purchase of a new Fire Truck. We can give you complete information regarding priorities and will gladly send you the necessary forms and help you fill them out.

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W. S. DARLEY & CO.

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MIDSHIP and FRONT MOUNT

"You have won for the second time the Army-Navy Production Award for meritorious services on the production front"
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DUPLEX, TWO-STAGE MIDSHIP MOUNTED

Patented

High Pressure performance entirely unaffected when unit used to pump gritty water.

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Impellers mounted on individual shafts—breakdown of one pump still leaves one for service.

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250 pounds pressure at engine speed equal to 30 M.P.H.—not possible with conventional two-stage pumps.

Other Types with Capacities to 750 G.P.M.

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AMERCAN-MARSH PUMPS, INC., Battle Creek, Michigan

Pumps — and pumps only — since 1873

Photo courtesy Goodwill Fire Company No. 1, Reading, Pa.

ANOTHER INSTANCE OF *Good Judgment*

When you see a FEDERAL Siren on fire apparatus you can be assured that "good judgment" put it there. You also can be assured it is a siren that is ruggedly yet finely designed and constructed —that it has a powerful and distinctive tone roar, and that it will give long unfailing service with minimum attention.

Investigate the FEDERAL line of sirens. There are many models from which to make a selection. Some are equipped with a flashing red light, others with an oscillating light.

A deep tone, long roll siren with flashing red light.

ARMY-NAVY "E"

WRITE FOR BULLETINS

FEDERAL ELECTRIC CO., Inc.

SIREN HEADQUARTERS

8717 So. State Street — Chicago 19, Illinois

Falstaff's Toast TO THE FIREMEN

THE Falstaff radio show has a custom of ending each program with a "good night toast," dedicated to a person or a group who especially deserve the appreciation and recognition of their fellow men. On a recent broadcast, "Falstaff Openshaw" toasted the firemen. His poem is presented herewith:

Here's a toast to some men of might
Of whom few poets ever write . . .
And yet their fame burns always bright.
And ev'ry one's a hero.

Though far away from shot and shell,
They fight their wars and win them well;
Their deeds the scrolls of history swell
Since ancient days of Nero.

No flags precede them into fray,
No banners fly, no bugles play;
We see them passing ev'ry day,
And think but little of it;

And yet, what dangerous lives they live,
How often their *own* lives they give!
Retreat is no alternative —
They fight it through and love it!

No city built could ever stand
Without this gallant, fighting band
To keep the enemy in hand —
Their courage should inspire men;

So join in — raise your glasses high!
A toast, dear friends, to testify
How on their valor we rely!
A toast, good folks, to firemen!

The Falstaff show is presented three times a week over the Blue Network by the Falstaff Brewing Corporation.

•

Goose Feathers

THIS is the story of a woman who always feared death by fire. She ordered her architect to build her a house that would "never burn," and then proceeded to fill it to the ceilings with flammable materials in a most unusual manner. Actually only the walls were "fireproof."

Miss Mabel Duncanson lived in Upland, California, with a flock of nearly 100 geese. In her house she had stored 20 to 30 sacks of goose feathers. Dressed in men's grease-covered overalls, she would go out to feed her flock at any hour of the day or night.

About 5:30 on the morning of November 6th, Miss Duncanson came into the house and sat down in an overstuffed chair. Just as her neighbors had known her to do, she placed the kerosene lantern she carried about the yard between her legs to keep warm. In the room where she sat, in her "fireproof house," were collections of paper, wood boxes, goose feathers, and all sorts of inflammable junk. She fell asleep and before long a fire occurred in which she perished.

A FATAL LEAP

EXCITEMENT and fear have always been a leading cause of fire fatalities. This is well illustrated in a fire in the New Oxford Hotel in Lynn, Mass., on November 12th. Fire occurred on the fourth floor, probably due to careless smoking. Although it was confined to the general area of origin, a 65-year-old man lost his life. According to Chief Joseph E. Scanlon, this excited man removed a "fire rope" from a hook near the window and with the rope still coiled, jumped three floors to a roof below and was killed. Chief Scanlon reports that the victim could have walked down the stairway with perfect ease.

The Building Exits Code of the National Fire Protection Association does not recognize fire ropes as an adequate means of life safety from fire. Ropes can in no way be considered a substitute for properly designed exits. Few people are sufficiently strong and agile to climb down a rope and even fewer persons, aside from sailors, have been trained to perform such feats of gymnastics.

The New Oxford Hotel in Lynn was a 4-story brick joisted rooming house and had closed stair shafts which would prevent rapid extension of fire. The department very quickly had the blaze under control. Total loss was only $3,100.

A NARROW ESCAPE

MEMBERS of the Covington, Kentucky, Fire Department narrowly escaped death early on the morning of December 1st when fire spread through the Madison Theatre building. Chief Frank A. Northcutt reports that the blaze apparently started in an overstuffed couch in the second floor lobby, due to a cigarette carelessly dropped into it.

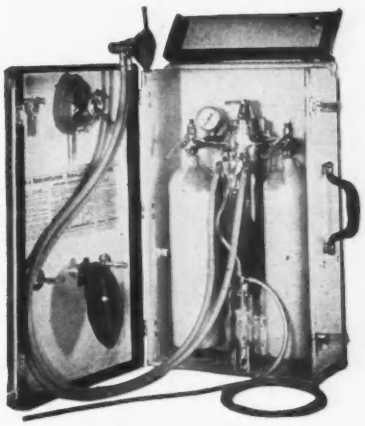
The fire smouldered unnoticed, entering the wall behind the couch, up to the ceiling and into a loft, a space about 5 feet high between the ceiling and the roof. The fire spread next over the entire theatre. It had probably been burning for several hours before the alarm was given at 3:15 A.M. by a cab driver who saw a small red glow just over the ticket window. There was no other opening in the front wall except a small window in the projection room.

Firemen arrived and found the fire in the front wall on the second floor where the couch had been. Nothing was left of the couch except some metal springs. The lobby was not damaged greatly but five minutes after the firemen arrived the theatre roof collapsed. Five firemen were beneath the balcony and four on the balcony when the crash came, but fortunately escaped death or injuries. After the roof collapsed the fire department brought the fire under control using 9 2½-inch lines, 6 1½-inch lines, and a 2½-inch line from the aerial ladder.

The fire department estimated the loss at $75,000.

AN OUTSTANDING RECORD OF LIVES SAVED

THE E & J Resuscitator Inhalator and Aspirator



The effectiveness of the E & J Resuscitator in treating desperate cases of Asphyxia speaks for itself in an unsurpassed clinical record. In cases where breathing has stopped it has proven to be a practical, safe and extremely effective instrument for administering artificial respiration without bodily pressure. Internal injuries, severe burns or fractured ribs are no impediment to efficient and successful artificial respiration when this modern scientific instrument is available.

WE INVITE YOUR THOROUGH INVESTIGATION OF THE GREAT LIFE SAVING RECORD OF THE E & J RESUSCITATOR INHALATOR AND ASPIRATOR.

E & J MANUFACTURING CO.

GLENDALE, CALIFORNIA

Drexel Bldg. Philadelphia — **17 East 42nd St. New York City** — **530 Fernando St. Pittsburgh** — **581 Boylston St. Boston**

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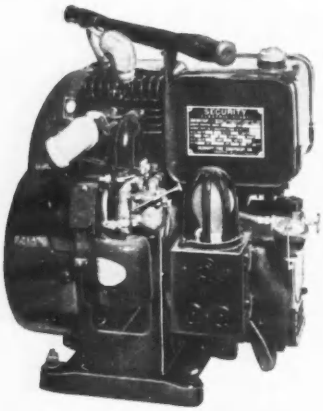
Pioneers and Specialists in Mechanical Artificial Respiration

PORTABLE
FLOODLIGHTING GENERATING PLANT



This 1500 watt portable generator, with 25% reserve, especially designed for fire department service. Lightweight, rugged and compact. Air-cooled 4-cycle engine 2¾" bore x 2¾" stroke. Quick starting. Fully guaranteed, thoroughly dependable.

Also from 600 to 2500 Watts in A.C. and D.C.

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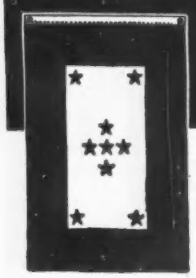
1550 Princeton Ave. Trenton, N. J.

HONOR YOUR SERVICE MEN



Honor your fellow-firemen now serving with the armed forces, by displaying this official

SERVICE FLAG

Blue stars, white panel field, of red. Send for catalogue.

One star for each one in service. Available in any size or material desired. Send for Free illustrated catalogue and price list today.

Permanent
ROLL of HONOR

A permanent plaque, with individual names in silver on gold-bordered permanent name plates. Beautiful walnut plaque with eagle and victory torches. Write for price list today.

U. S. and Allied Flags in all sizes. Write for prices.

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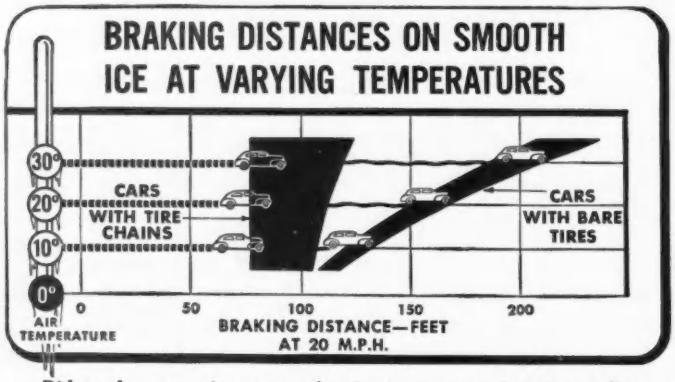
COLD FACTS



Did you know wet ice at near thawing temperature is twice as slippery as ice at zero temperatures? This National Safety Council chart shows braking distances on ice at varying temperatures with and without anti-skid chains. Facts are based on thousands of tests on Lake Cadillac, Mich., and at Iowa State College.

Prepare Now for Winter Driving

MANY firemen are seriously hurt in traffic accidents going to fires. As every driver knows, winter hazards cause more accidents than any other season. Having the right of way does not guarantee immunity from danger because during the winter season of closed windows it is more difficult for motorists to hear the siren. For volunteer firemen who are apt to be driving their own cars to fires, Judge Harry H. Porter, of the Safe Winter Driving League, released some information as to the gravity of winter hazards:

"Unless motor vehicles operators in over 36 northern states take practical precautions for the increased hazards of winter driving, there can be a serious lack of highway transportation by next spring. Results of research into last winter's accidents to essential vehicles, made by Prof. Ralph A. Moyer of Iowa State College, chairman of the National Safety Council's Committee on Winter Driving Hazards, indicated that skidding and reduced visibility in 36 snow-belt States ran the mileage death rate up 53 per cent over the summer rate in those states. Unusually severe snow and ice conditions south of the Mason-Dixon line caused an increase of 24 per cent in some of the other 12 states. All drivers of vehicles essential to wartime economy should immediately prepare and repair winter safety equipment such as windshield defrosters, anti-skid chains, heaters, and windshield wipers.

"The following practices, based on National Safety Council research, are recommended for this winter:

"1. Reduce your speed to conform to the conditions of the road — and take no chances. 2. Use tire chains on ice and snow to reduce braking distances as much as 40 or 50 per cent. Chains also provide necessary 'go' traction, and uniformity in performance under severe road conditions. 3. Follow other vehicles at a safe distance It takes from 3 to 11 times as long to stop without anti-skid chains when pavements are snowy or icy. 4. Apply brakes on slippery pavements lightly and with a pumping action. If you jam on the brakes, they may lock and throw your car into a dangerous skid. Try to avoid need for making a quick stop in front of another vehicle. A rear-end collision may cripple your car for the duration. 5. Keep windshield and windows clear of snow and ice outside, and fog and frost inside. Remember, you must see danger to avoid it. 6. Keep posted on winter road and weather conditions. A safe driver is always aware of his limitations."

Let's get to fires safely and ready for work.

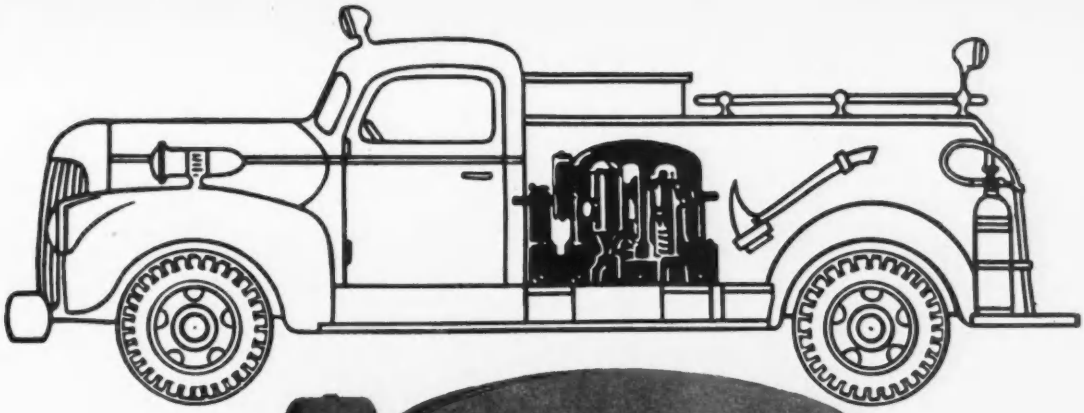
Research on Flame-Proofed Fabrics

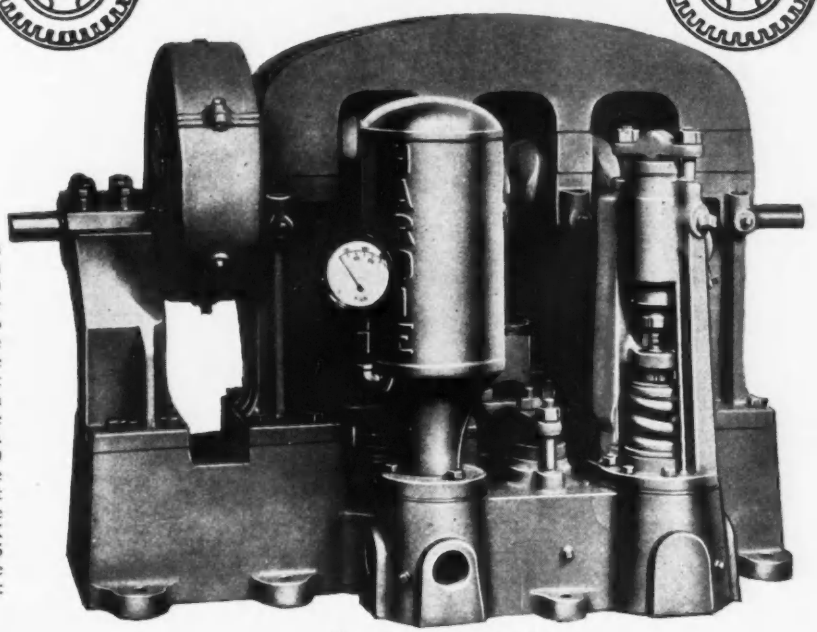
(*Continued from page 16*)

dard-Hochstadter method would probably be more economical in the commercial preparation of sodium tungstate since it does not require high temperatures or fuel costs.

"Samples of paper, cotton cloth, and rayon cloth were treated with a 10 per cent solution of sodium tungstate. The treated paper was found to be flame-resistant to a high degree. Cotton and rayon cloth treated with the solution remained flame-proof after five dry cleanings. The cloth remained noticeably flame-resistant in spite of three launderings.

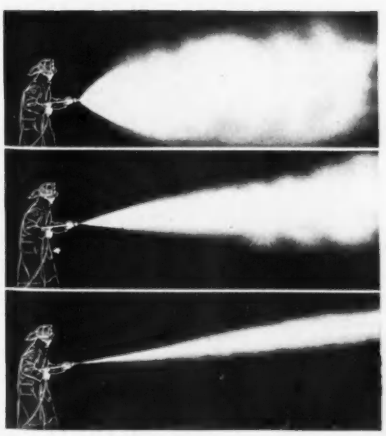
"In the world of tomorrow there need be no tragedies similar to the Boston fire. Evening garments will be flameproofed and one flameproofing will last the life of the garment. 'Flame-Proof' and 'Fire-Resistant' will be seen on clothing labels tomorrow just as often as 'Water-Proof,' 'Water-Repellent' and 'Sanforized' appear on such labels today. 'An ounce of prevention is still worth a pound of cure.' Flameproofing will be that ounce of prevention."





● The Hardie High Pressure Pumps give you 600 to 800 P.S.I. at the slow speed. No need to crowd the Hardie to get the nozzle pressure you must have to produce a true fog. The Hardie LCXA pump delivers 60 gallons per minute at 800 P.S.I. at 130 R.P.M. The Hardie XCXX pump delivers 35 gallons per minute at 800 P.S.I. at 118 R.P.M.

Hardie Imperial LCXA



● The compact powerful Hardie High Pressure Pump fits readily into all types of fire trucks. Conversion of existing equipment to Fog Fire Fighter is easy and inexpensive in most cases. The manufacturer of the truck you wish to convert will gladly tell you how you can put a Hardie pump into it and enjoy all the advantages of this new and better method of controlling many types of fires. When you buy a Fog Fire Fighter specify the Hardie pump and Hardie Fog Gun. Leading fire control equipment manufacturers equip their Fog units with Hardie pumps and guns. Complete specification data on request.

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Fyr-Fyter

Fire Fighting Calls for High Strategy

(Continued from page 11)

for the second alarm companies are on their way and by the time they arrive he must know just where to place them. An instant's delay may be disastrous; one unprotected salient may mean a conflagration. And all this cerebration must be accomplished in the midst of a blanket of smoke that completely obscures the field of action and would send the ordinary mortal scampering for air with stinging eyes and a gasping cough.

In making his plans the Chief has to consider the following crucial problems: He must first try to keep the fire in the cellar. That means sweeping the street floor with water and guarding with special care any shafts or hoistways that may carry the fire to the upper floors. It means also getting water on the fire below. But he must also prepare ahead of time for the fire to extend throughout the building. Not only that; he must consider the surrounding property and protect it from every possible danger. In the rear the burning building is separated from another inflammable structure by only a narrow court, and above on each side rise adjoining buildings four stories higher with exposed windows facing over the roof. Each of these exposures, highly dangerous should the fire "get away," must be adequately protected. Every fire battle has at least four fronts to be considered.

By the time the first companies summoned on the second alarm arrive, the Chief has at least the broad outlines of his campaign worked out. The rules of procedure require each company to report to the commanding officer on reaching a fire. The Chief orders the first two engine companies to stretch their lines into "deck pipes" on hose wagons placed directly in front of the building. In a few moments, from these nozzles that look like small guns mounted behind the driver's seat, powerful streams of water smash their way into the rising waves of smoke that billow out of the first floor. Another engine company goes to the assistance of those that are gallantly fighting to get at the fire in the cellar. The truck company is ordered up the fire escapes to smash all the windows the men can reach and to open the skylights on the roof. The more smoke quickly let out of the building the more quickly will the fire be reached.

BUT the Chief has not forgotten his second line of defense. He orders the last engine company to arrive on the second alarm to connect its line to the watertower. Even while the fire is still confined to the cellar the graceful miniature Eiffel tower rises with stately motion in front of the building, ready on an instant's notice to sweep the upper floors with its cataract of water. It is an axiom of fire fighting that if a fire once gets a headway in a building it will shoot up stairwells and shafts to the top floor, and, finding no vent for escape, will "mushroom" in every direction. This the Chief prepares for in advance.

Even as his plans are made — in the swift passage of a few closely crowded minutes — the expected comes to pass. Suddenly a window next to the roof falls out. A shower of tinkling glass spatters on the street below and out of the gaping window frame the same evil-colored brownish smoke pours out clear across the street. It recedes a moment, a dull red glow appears behind it and, as all the rest of windows on that floor fall to the street, a shimmering stream of flame floods out and licks around the cornice. The Chief turns on his heel, orders his aid to "pull a third" alarm, and begins to develop his second line of attack. The fire has now involved the entire core of the building.

In the few minutes that elapse before the third alarm companies begin to swarm in he makes a mental note of where they should be placed to realize the next objective. The fire must now be fought on every floor. As the companies arrive he divides them up; three of them go up the front fire-escapes, two to the block behind to stretch their lines through the buildings in the rear and to cover the fire from the court. He will make a desperate attempt to hold the fire in the centre of the building. But the companies cannot maintain their position for long. They take terrific "punishment" from smoke and heat, but cannot make an entrance on any floor.

The Chief must now make another decision — this one critical because it involves the safety of his men. The same decision has to be made at almost every major engagement. The Chief must keep his forces on the firing line up to the last possible moment of safety — even on an off chance of victory; but he must also give them time to retreat. And in fire-fighting, as in military strategy, a retreat is usually a more difficult manoeuvre to execute than an advance.

At the psychological moment the Chief gives the order "back down," and the companies scramble down with their lines to the street. The fire has now complete possession of the building and only a matter of minutes will see flames pour out of every floor. The Chief again tells his aid to summon assistance — a fourth alarm and then a fifth go out over the department wires and the campaign reaches its final stage. The objective now is to keep the fire from spreading beyond the building in which it started. And again the Chief formulates his plans before the next batch of apparatus arrives.

Now it is a matter of covering every exposed position. The Chief sent out two more alarms because of the area that needs protection, but he waits a sufficient time between them — even though by this time

(Continued on page 30)

The Bettman Archive

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Replaced Horsepower with Manpower!

INDIAN FIRE PUMPS are the last word in modern fire fighting equipment. A crew equipped with these portable, quick action hand pumps can swarm over a fire and put it out in a jiffy without laying a length of hose. Clear water does the trick. No chemicals. INDIAN FIRE PUMPS work equally as well on inside as on outside fires. Tests prove it. Order now — be prepared for spring fires — Send for catalog and price list.

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DON'T
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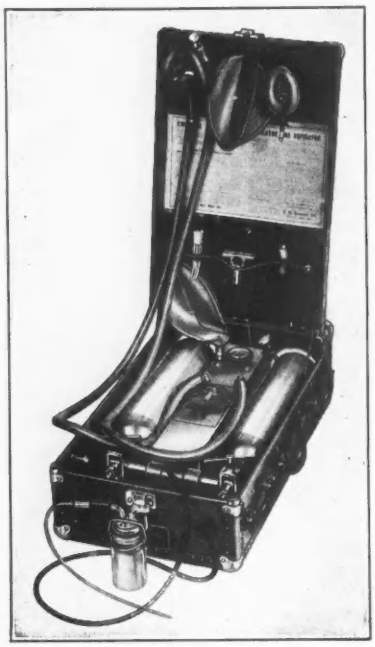

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N. F. P. A. Volunteer Firemen's Section
MEMBERSHIP REPORT

MEMBERSHIP PLAN

● Through the Volunteer Firemen's Section, fire companies may become members of the National Fire Protection Association. As a member fire company, the department receives at headquarters a set of all regular N.F.P.A. publications. This includes the Quarterly, the monthly News Letter, posters and bulletins.

● Each member fire company has the Volunteer Firemen magazine sent to the homes of ten men at no extra charge beyond the ten dollars annual dues paid by all associate members of the N.F.P.A. All other N.F.P.A. members pay ten dollars without the ten copies of Volunteer Firemen.

● If more than ten firemen want to receive Volunteer Firemen, an additional dollar should be sent for each extra fireman listed to receive the magazine. Individual subscriptions are not accepted from departments not members of the N.F.P.A.

WITH this issue of the magazine, we start the 12th volume. It is hoped that the year of 1945 will bring a substantial measure of victory in the wars in which we are engaged. All fire departments are anxiously looking forward to the time when their members in the armed forces will return.

VOLUNTEER FIREMEN editors wish to express appreciation to the members of the section for helpful support and suggestions. The section has increased by 73 new departments in the past year, and has reached a new peak in enrollment. There are still, however, many volunteer fire companies which we feel would enjoy the benefit of membership if it was brought to their attention.

The 20 new members this month are as follows:

Supply Officer, Naval Operating Base, Fire Department, San Francisco, Cal.
Northbrook Volunteer Fire Department, Northbrook, Ill.
Pinckneyville Fire Department, Pinckneyville, Ill.
Cedar Lake Volunteer Fire Department, Cedar Lake, Ind.
Earlham Volunteer Fire Department, Earlham, Iowa
Ocheyedan Fire Department, Ocheyedan, Iowa
Caroline County Fireman's Association, Preston, Md.
Allen Park Volunteer Fire Department, Allen Park, Mich.
Muskegon Township, Company No. 2, Muskegon, Mich.
Cook Fire Department, Cook, Minn.
City of Tower Fire Department, Tower, Minn.
Wolf Point Fire Department, Wolf Point, Mont.
Salem County Firemen's Association, Elmer, N. J.
Lake Parsippany Volunteer Fire Company, Inc., Morris Plains, N. J.
Chesterland Volunteer Fire Department, Inc., Chesterland, Ohio
Terrace Park Volunteer Fire Association, Terrace Park, Ohio
Westinghouse Fire Company, Lester, Pa.
LaGrange Fire Department, LaGrange, Texas
Teago Fire Department, South Pomfret, Vt.
Vienna Volunteer Fire Department, Vienna, W. Va.

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In a Minute and a Half···

Official U. S. Navy Photograph

The total output of AER-O-FOAM has been taken by the U. S. Navy, for many months, but we are now able to offer a limited quantity for civilian use.

This Hellcat burst into flames as it approached the carrier. Efficient fire control extinguished the flames saving pilot and plane.

For Gasoline, Oil and Similar Serious Fires FOAM

is the Acknowledged Extinguishing Medium

BACK THE ATTACK
BUY WAR BONDS

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Our engineers will be glad to consult with you and recommend the type of Foam and equipment best suited to your needs.

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Specializing in Foam Fire Protection

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RIDE WITH YOUR APPARATUS!

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INHALATOR

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When you respond to every alarm with the H·H Inhalator at hand for instant use, you're equipped to meet respiratory emergencies with speed and safety. Developed by medical science to meet the need for safe resuscitation of victims of respiratory distress, and used in conjunction with the Schaeffer prone pressure method of artificial respiration, this famous instrument supplies oxygen-carbon dioxide mixture according to the patient's lung demand—without pressure—without suction—assisting recovery by effective, natural means.

Write for descriptive Bulletin No. CA-9.

MINE SAFETY APPLIANCES COMPANY
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"WOLF! WOLF!"

UNDOUBTEDLY everyone is familiar with the boy who cried "Wolf! Wolf!" so often that no one paid any attention when the real wolf came along. That the same sort of thing may happen in the case of fire may seem a bit incredulous, but a recent 3-alarm fire in the 29-story Park Plaza Hotel in St. Louis, Missouri, gives us a fireman's version of this old story.

From all indications, the fire had been burning for some time before the fire department was called. For years this hotel has floodlighted the top story and directed red lights at steam escaping from a vent in the roof. This in the past has resulted in false fire alarms. Undoubtedly, people in the neighborhood felt some hesitancy about reporting a fire. Hotel telephone operators have had instructions not to put through fire alarm calls before consulting the management. When the fire was reported, the assistant manager went to investigate reports of a fire on the 26th floor. Before employees could be summoned to use private hose equipment and before the fire department had been notified, the elevators went out of service, forcing firemen to walk up the 25 flights (try this with boots on).

The fire was controlled by use of 1½-inch first-aid hose supplied by a 5,000-gallon tank, supplemented by 3-inch lines connected to a fire department connection at the street level. Sections of 2½-inch hose were carried up the steps by firemen and a 2½-inch hose line was also hoisted up the outside of the building but fortunately these streams were not needed. The fire was confined to a storage area on the 26th floor. Loss, $25,000.

OUR MEMBERS SAY

VOLUNTEER fire departments are well aware of the value of N.F.P.A. membership. They may not, however, realize the value attached to membership in the association by professional men. The letter quoted below by Fire Prevention Engineer Eugene W. Dick, of Philadelphia, speaks for itself:

"This is to acknowledge receipt of your letter and notice for my dues for the year of 1945, which I am very glad to send.

"It is a year since I joined your Association, and at this time I want to let you know that I do appreciate being a member of this Association, for I have gained more knowledge about fire fighting and prevention than I ever could gather together in all my life. The books that I have been able to buy from your organization were the tops. You have been able to help me in a number of ways that may seem very small to a lot of people, but to me they were without value in dollars and cents.

"The amount of dues that I pay per year is very small for what I get in return in knowledge; and that is priceless to any man who wants to use it.

Fire Fighting Calls for High Strategy

(*Continued from page 26*)

the fire is roaring out of the building half way across the street — to allow of placing all the fourth alarm companies before those on the fifth come pouring in. First he covers the rear. Companies make their way into every floor of the building behind and direct their streams across the court. Then before the flames burst through the roof, he has companies on both adjoining roofs to wet down the walls and prevent the fire from entering the exposed windows on either side. The lines of hose which the third-alarm companies had take up the fire escapes he now has coupled with more deck pipes in front of the fire.

The cycle of strategy is now complete; the battle lines have been completely laid out. From now on it is only a matter of shifting forces here or there to meet a need or fill up a gap. The chief takes his position on the sidewalk in front of the building. From there he receives constant reports from every front and dispatches the necessary orders. Once the fire bursts its way through the roof the pressure below is relieved and much of the danger is past.

This entire drama has taken place in less time than it takes adequately to recite it: from the discovery of the fire to the arrival of the fifth-alarm companies, half an hour. For crowded action, for concentrated fury of activity and for lurid color of setting, a big fire — at least in the first stages — can hardly be duplicated on the stage of human affairs. The plot at every fire develops along much the same lines as the typical fire described; but there are infinite variations on the theme and the best commanding officer is he who can decide on the turn of a second how each can best be coped with.

Each type of building presents its own special fire-fighting problem and for each one the experienced officer has worked out his own technique. At the tenement-house fire the drama centers about the saving of life — at least for the first few minutes of the performance. It is largely a matter of ladder work. "Cover the building with ladders and get them out whatever way you can" is the way an experienced Chief puts it. Rescues are unique achievements for which few rules can be laid down. Skyscraper fires center about the use of standpipes and the problem of adequate pressure. Dock and pier fires involve the fire-fighting fleet and a combined attack by land and water. Lumber yards are long-drawn-out affairs, with a big job of "overhauling" — going over the ruins to see that the last sparks are out.

But whatever the surroundings may be, and whatever buildings are involved, fire is a quick and a highly dangerous opponent. As one of New York's veteran Chiefs put it: "There's one rule that holds good for every fire: You've got to keep one jump ahead of it or you're gone."

RUBBER or CANVAS
COMBINATION SUIT

NOW AVAILABLE!

Special combination suit with Bunker Pants is Midwestern's Outfit No. 101. Detachable wool linings. Flexible elastic inner sleeve for wrist. Keeps out water, cold and sparks. Equipped with Midwestern Safety Snap, a new exclusive feature. Can be easily and quickly fastened or unfastened — nothing can catch on it. Will not freeze or jam as easily as old type snap. Midwestern garments are favored by the larger municipal departments throughout the country. Write for literature and prices.

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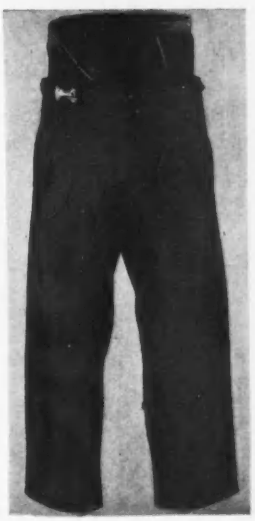

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- Rubberized fabric belt in lining
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Regular Firemen's Boots Now Available!

Fireman's boots ¾ length, reinforced instep, felt linings. Do not confuse these boots with reclaimed boots which have been offered firemen for past 2 years. These are regular fireman's boots made of the new synthetic rubber. Write.

See your Midwestern Mfg. Co. representative for catalog and prices, or write the factory.

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STORAGE Battery and Dry Cell Outfits for all types of service. Also Spotlights for cab mounting on vehicles.

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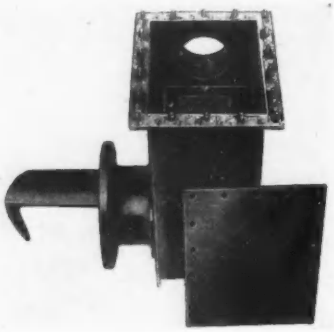
MANUFACTURERS' ANNOUNCEMENTS

New Foam Chamber for Oil Storage Tanks Aids Fire Fighting



FOR foam fire protection on modern oil storage tanks of the pressure type, the new" Evertite" Foamite Delivery Chamber makes for simple, effective installation, it is announced by the manufacturer, American-LaFrance-Foamite Corporation, Elmira, N. Y. The "Evertite" Delivery Chamber provides an easy means of applying a blanket of fire-smothering foam to burning oil surfaces, yet prevents release of tank pressure.

A newly designed foam deflector, permanently attached to the throat, eliminates any special baffle installation. The foam discharge is deflected with a rotary motion against tank shell and down to the oil surface without undue disturbance of the liquid, or foam breakdown.

Use of the "Evertite" Delivery Chamber avoids the dangerous practice of using ordinary pipe connections discharging directly into the tank near the roof. Such practice may result in the fire draft throwing a large proportion of the foam discharge outside the tank.

●

Dugas Now Division of Ansul Chemical Company

THE Ansul Chemical Company of Marinette, Wisconsin, has announced that its subsidiary, Dugas Engineering Corporation, has become a division of the parent company and will be known henceforth as the Dugas Division of Ansul Chemical Company. In the five years since Ansul became sole owner and operator of Dugas Engineering Corporation, the products, Dugas fire extinguishing equipment, have become widely known and used. Among the advances made during this period were the development of "Plus Fifty" Dry Chemical as the extinguishing medium of Dugas equipment and significant improvement in the design of hand and wheeled extinguisher models. Plans for the future of these Ansul products are broad and intensified.

New Burn Treatment Announced

A NEW chemical formula, Hydrosulphosol Ointment is being introduced to industry by the Davis Emergency Equipment Co., of Newark, N. J., after six years of extensive clinical tests. Hydrosulphosol Ointment and Hydrosulphosol Solution, the Company's introductory publicity states, have passed a thorough and intensive study. Reports published in certain medical journals, offering test cases and specific results, point up the powerful healing values of Hydrosulphosol Ointment through its chemical barrier to oxygen. Hydrosulphosol, the reports reveal, not only thwarts penetration by oxygen into scarred tissues, but by itself suffusing the damaged tissues, breaks down oxidized cells and helps stimulate the natural restoration of injured tissues.

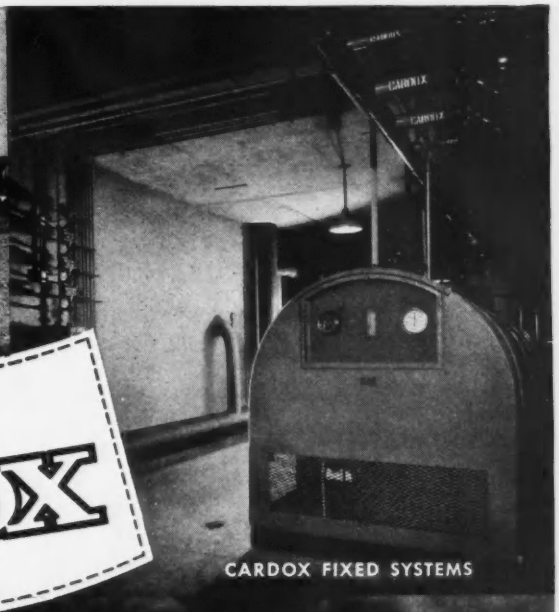
Publicity releases by the manufacturer of this new sulfhydryl solution list its major healing features as: quick relief from pain, infection control, acceleration of healing, non-toxic safety and the stimulation of new tissues or repair of burned ones to check the danger of disability. The Davis Company will gladly send its Bulletin No. 134 and a group of medical reports on request.

●

New Decal Locates Plant Fire Equipment

RANDOLPH LABORATORIES, INC. manufacturer of approved carbon dioxide fire extinguishers has developed a new extinguisher locater sign; a decal water-transfer that can be instantly placed on the wall above extinguishers. This neatly designed, 10-inch diameter locater, printed in large white letters on a bright red background, is visible for 75 feet. Directions for application are printed on the reserve side of the transfer. Locaters may be obtained from the manufacturer at a minimum charge. Write Randolph Laboratories, Inc., 8 East Kinzie Street, Chicago 11, Illinois.

CARDOX FIRE TRUCK



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In and around America's vital war plants . . . on our big and busy military airfields . . . fire protection is provided by Cardox Fire Extinguishing Systems, Fire Trucks and Airport Fire Trucks.

Each is a highly specialized fire extinguishing tool . . . exactingly engineered to do a specific job quicker and more effectively than it has been done before. But all Cardox Systems and Mobile Units have one outstanding characteristic in common: *Cardox Engineering in the application and control of carbon dioxide, stored at 0°F. and 300 p.s.i. in a single Storage Unit containing from ¼ to 125 tons of fire-destroying Cardox CO_2.*

For Cardox has given the recognized advantages of carbon dioxide a new and broader scope of fire extinguishing performance. Because of this, these advantages can be applied equally well to small or *very large* fires through *mass* application of Cardox CO_2, released in *pounds* or *tons*.

The efficiency of Cardox Systems and Mobile Units in giving fast-acting, nondamaging carbon dioxide *enhanced extinguishing* performance is made possible by Cardox methods of control and application that give Cardox CO_2: (1) Uniform extinguishing characteristics regardless of plant or atmospheric temperatures; (2) Availability in ample quantity for uninterrupted protection and mass application at high rate; (3) High CO_2 "snow" yield for increased cooling effect; (4) Effective projection through relatively great distances.

On the basis of this performance Cardox has been given many of the toughest fire protection assignments—*all over the country*. Find out how through practical cooperation Cardox and its engineering staff can assist you to make your planned fire protection more effective. Write on company letterhead for Bulletin 2615.

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CO_2 FIRE EXTINGUISHING SYSTEMS

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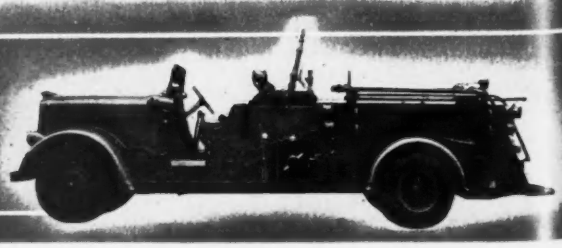
HERE'S what we would want to know about the manufacturer.	AND here are the answers as they apply to Ward LaFrance
● *Just who are these people, anyway?*	The Ward LaFrance business is over twenty-five years old. Now a division of Great American Industries, Inc., Mr. A. Ward LaFrance continues to head and supervise engineering and manufacturing at Elmira, as Vice President of "G.A.I."
● *What's their reputation?*	We'd rather let others tell you about that, and we will gladly give you the names of hundreds of fire officials in towns and cities of all sizes who know Ward LaFrance apparatus from years of using it.
● *Are they "up" on the latest developments in fire engineering?*	Among recent purchasers of Ward LaFrance-built fire apparatus are the U. S. Army, the U. S. Navy, New York City, Philadelphia, Pittsburgh and Minneapolis. Nothing but the latest and best will satisfy such customers.
● *Is motorized fire apparatus their real business, or just a side line?*	Ward LaFrance people are "fire" people. Their engineers are specialists. Fire apparatus is their *main* peacetime line, not a side line.

Now is the time to think about replacing old motorized equipment with ultramodern apparatus. Consult our engineers about the requirements of your community.

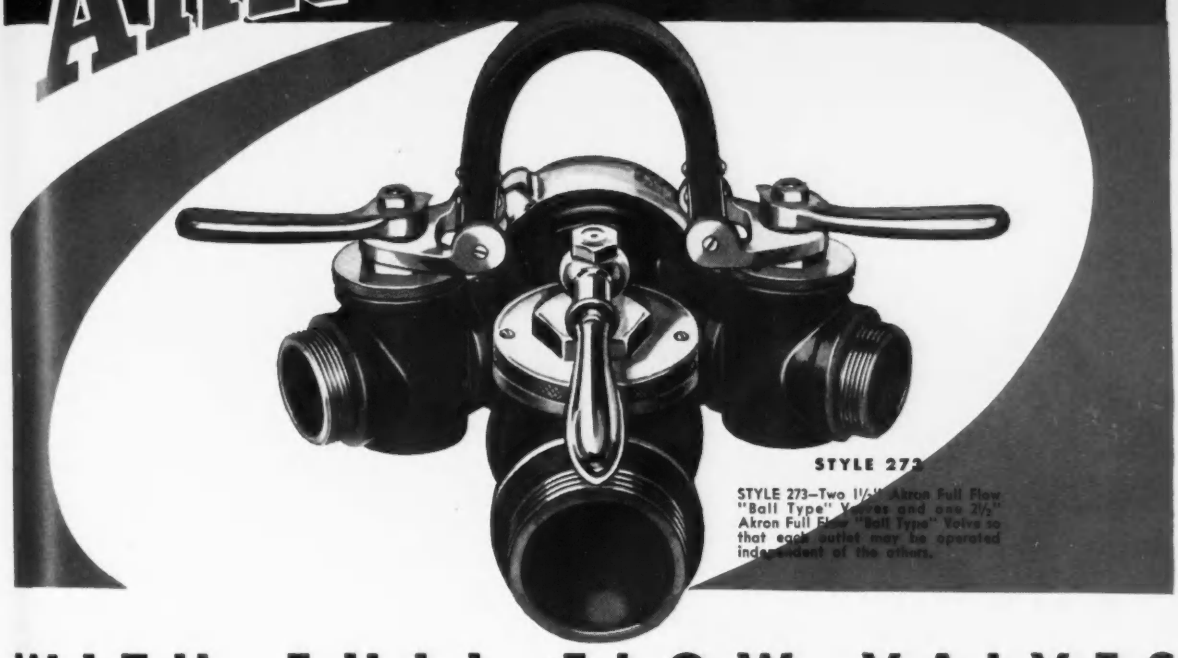
WARD LaFRANCE

TRUCK DIVISION, GREAT AMERICAN INDUSTRIES, INC.

ELMIRA NEW YORK



AKRON WATER THIEF



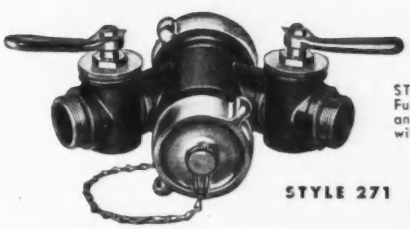
STYLE 273

STYLE 273—Two 1½" Akron Full Flow "Ball Type" Valves and one 2½" Akron Full Flow "Ball Type" Valve so that each outlet may be operated independent of the others.

WITH FULL FLOW VALVES

With the Akron Water Thief attached to apparatus or hydrant you can switch from large to small hose lines, or from small to large, without loss of time in removing either hose line. Simply turn valves as desired. For instance, if 2½" hose line is no longer necessary to handle fire, then two small hose lines may be used. Or with two small hose lines in use, a larger stream may be placed in service. This valuable aid in effective fire fighting is offered in different types shown here. Write to us for full details.

AKRON BRASS MFG. COMPANY, INC.
WOOSTER, OHIO



STYLE 271—Two 1½" Akron Full Flow "Ball Type" Valves and 2½" open end provided with cap and chain.

STYLE 271

STYLE 270—Akron Granger Water Thief. One end threaded 2½" female thread, other end 2½" male thread, so fitting may be placed in hose line or on hydrant and 1, 2 or 3 hose lines taken from same. All small outlets capped as shown.

STYLE 270

AKRON BRASS
FIRE FIGHTING EQUIPMENT

S-O-S Fire Guard

HEAVY DUTY

vaporizing liquid chokes flame

S-O-S Fire Guard dispatches fire with a potent dose of vaporizing liquid. It is America's great utility fire extinguisher because of its handy size and overall effectiveness. **S-O-S Fire Guard** vaporizing liquid forms a heavy fire-smothering gas, quickly stifles flame, guards against post-ignition hazards. **S-O-S Fire Guard** resists freezing to a point approximately 48° below zero. Patented Safety Phlare design assures *new* pump action at all times.

WHERE to use S-O-S Fire Guard

Especially designed for electrical, chemical, gasoline, and paint fires. Ideal for car, truck, plane, boat, home, and factory use.

HOW to use S-O-S Fire Guard

Turn handle either way to release safety lock. Aim extinguisher and use pumping action. Direct the stream around the outer edge or side of fire to smother flame.

SAFETY PHLARE

FREE Above S-O-S Fire Guard poster enlarged for wall display. Write Detroit office.

IF IT'S GENERAL IT'S DEPENDABLE

THE GENERAL DETROIT CORP.

2270 E. JEFFERSON AVE., DETROIT 7, MICH.

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